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THE  
CHINA SEA  
DIRECTORY.

VOL. I.  
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SUPPLEMENT TO CHINA SEA DIRECTORY, VOL. I.

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## DIRECTIONS FOR MALACCA STRAIT.

COMPILED BY

STAFF COMMANDER JOHN CUMINS RICHARDS, R.N.



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## ADVERTISEMENT.

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THIS Supplement to the China Sea Directory, volume I., describes the coasts of Malacca strait, from Acheen head in Sumatra and Salanga island on the Malay peninsula, to the western entrance of Singapore strait; and also contains directions for the navigation of the main channel.

The directions have been compiled by Staff Commander J. C. Richards, R.N., Hydrographical Department, Admiralty, in great part from the following surveys:—

The coast of Sumatra, from Acheen head to Diamond point, by Commander W. Fell, I.N., 1851; from Diamond point to Batoo Barra, by Lieutenant Henry Jackson, I.N., 1860; the remainder of the coast from Batoo Barra including Brewers strait, by Lieutenants W. Rose and R. Moresby, I.N., 1822. The coast of the Malay peninsula from Bass harbour (Lancava islands) to Tanjong Bolus, including the outlying islands and dangers by Lieutenant C. Y. Ward, I.N., 1852-1858.

Many of the remarks derived from the above surveys were originally given in Horsburgh's East India directory; to these have been added much useful information derived from the observations and remark books of Officers of H.M. ships, and from other recent authorities.

Notices of errors or omissions in this work, which describes an important route for shipping, should be transmitted to the Secretary of the Admiralty, in order that the information may be made use of for the benefit of the navigator.

F. J. E.

Hydrographic Office, Admiralty, London,  
January 1876.





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**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC  
EXCEPT WHERE MARKED AS TRUE.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF  
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO  
100 FATHOMS.**

**THE SOUNDINGS ARE REDUCED TO LOW WATER OF ORDINARY  
SPRING TIDES.**

# SAILING DIRECTIONS

FOR

## MALACCA STRAIT.

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### CHAPTER I.

#### INTRODUCTION.

**GENERAL REMARKS.**—Malacca strait may be considered as limited on the north-west by a line joining Acheen head and Salanga or Junkseylon island, and on the south-east by a line joining Carimon islands and Tanjong Bolus, at the western entrance of Singapore strait. Within these limits Malacca strait is 550 miles long, in a general south-easterly direction; it is 210 miles broad at the western entrance, 160 miles broad at Diamond point where the strait first narrows, and 8 miles broad at the eastern entrance.\*

The western or Sumatra side of the strait is an alluvial plain, generally only a few feet above the level of the sea, and varying in extent from 60 to 100 miles from the mountain ranges of Sumatra: the low coast line is unbroken by any large bays, but forms near the narrowest part of the strait a range of low islands. The coast is intersected by numerous rivers, some of which are of considerable magnitude, and subject to the bore or tidal wave; the neighbourhood of these rivers appears to afford almost the only clear space for cultivation. The population of Sumatra, consisting chiefly of Malays, is divided into several nations or states, some of which have made considerable progress in civilization; others, chiefly those living in the mountainous regions of the island, are but little removed from the savage state. Of these nations, the north end of the island belongs to the kingdom of Acheen, the Batak nation next to the south-

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\* See Admiralty charts: Indian Ocean, northern part, No. 748*b*; Sumatra, west coast, sheet 1, No. 2,760; Malacca strait, sheet 1, Diamond point to North Sands, No. 1,353; Malacca strait, sheet 2, North Sands to Singapore, No. 1,355; North coast of Sumatra, Acheen Head to Diamond point, No. 219; Malay coast, Pulo Penang to Parcelar hill, Nos. 798 and 793*b*; North and South sands, Nos. 794*a* and 794*b*; Cape Rachada to Mount Formosa, Nos. 795*a* and 795*b*; Mount Formosa to Tanjong Bolus, No. 796.

eastward ; then the Siak state, which is traversed by the finest river in Sumatra, bordering the narrowest part of the strait.

The eastern or Malayan side of the strait is for the most part low and wooded near the coast. A mountain chain traverses the Malay peninsula, and here and there isolated mountains are found within a few miles of the coast. The mountain chain diminishes in height as it approaches the Equator—many of the peaks north of Queda rise to an elevation of 6,000 feet, while few in the southern part of the peninsula rise above 3,000 feet. Between the mountains and the coast the surface is undulating, covered with dense primeval forests, or interspersed with grassy plains, which are more numerous and extensive in the north.

Many rivers empty themselves upon the Malay coast, and in their progress form marshes and lakes, some of which are of considerable size. The banks of the rivers are generally low and swampy, and covered with mangrove and other thickets. Several of the rivers are broad and moderately deep, but all are barred by banks or reefs, which, as a general rule, prevent a vessel drawing more than 8 or 9 feet entering. In the northern part numerous verdant islets stud the coast.

Part of the Malay coast is occupied by British settlements, namely, Province Wellesley, a strip of coast 8 miles broad and 35 miles long, adjacent to Pulo Penang (also a British settlement); and the settlement of Malacca, about 40 miles in length and 25 miles in breadth, included on the sea coast between the rivers Lingey and Moar. The intervening territories are occupied by various Malay states, the population of which are much addicted to piracy.

The navigable channel of Malacca strait is of considerable width at the north-western part. Abreast Penang it is 120 miles wide, and gradually decreases in width until Arroa islands and North Sands are approached. Here commence a series of long and narrow shoal banks, which extend nearly through the centre of the strait in a north-west and south-east direction, and with little intermission to the south-eastern end of the strait ; they narrow the available channel in some parts to 8 or 10 miles. Both shores of the strait are fringed with shallow mud-banks, which on the Sumatra side extend seaward in some places a distance of 18 miles, but from the Malayan side much less ; these banks, together with those in the offing, are, as a general rule, steep-to. There are also several detached groups of islands.

**Soundings.**—The soundings in the north-western part of Malacca strait outside the fringing banks vary from 25 to 50 fathoms ; in the south-eastern part from 10 to 30 fathoms. Some of the central banks are nearly dry, and should be approached with caution.

**WINDS AND WEATHER.**—Although Malacca strait is within the



limits of the north-east and south-west monsoons of the Indian ocean, yet on account of the high land on either side of the strait the winds are variable; but land and sea breezes are regular on both coasts. In the offing the monsoons are only regular when they are at their height in the adjacent seas; even then, however, the wind is moderate in the channel and only lasts during a part of the day. The monsoons become more regular near Singapore.

**South-west Monsoon.**—Near Acheen head the south-west monsoon commences in the latter part of April or early part of May, and ceases in October; but in November westerly winds frequently prevail; during this season the weather is generally cloudy and stormy accompanied with rain, especially in June and July, when the monsoon is at its highest.

The south-west monsoon seldom blows far into the strait. In the middle of the strait during this season variable winds, chiefly those from S.E. and S.W., prevail with long calms. On the Sumatra side light winds and calms prevail, and heavy squalls from the land are experienced during the night. On the Malayan side there are fewer calms and seldom any squalls; variable winds or land and sea breezes are experienced.

**Sumatras**, or squalls from the south-west, are more common during the south-west monsoon than in the north-east monsoon. They generally blow during the first part of the night, are sometimes sudden and severe, and are accompanied by thunder, lightning, and rain; they are more frequently met with on the Pedir coast (Sumatra), and on the Malay coast between Parcelar hill and Carimon islands. Here they often blow for six or eight hours at a time as a strong or moderate gale.

**North-westers** are not so frequently felt as the Sumatras; they are most common during the south-west monsoon and in the north-western part of the strait between Acheen head and Arroa islands, but sometimes blow through as far as Singapore strait. These winds are sometimes severe at their commencement, but their strength soon abates. They are generally preceded by a black cloud arch, which rises rapidly from the horizon towards the zenith, often allowing not more than sufficient time to reduce sail after its first appearance. They are sometimes accompanied by lightning, thunder, and heavy rain.

**The North-east Monsoon** prevails in the western entrance of Malacca strait from November to April, which is the fair season, the weather being then more settled; there are seldom any hard squalls, and there is less thunder, lightning, and rain than in the other season.

In November the winds are variable, frequently from N.W. and West, although occasionally the N.E. winds set in regularly in November. From this period to March the north-east monsoon is strongest, but at times N.W. and West winds of one or two days duration have been experienced in

every month when the north-east monsoon should prevail. Late in March the N.E. and northerly winds become light and variable, with strong land breezes at night. On the Malayan side these breezes commence between 8 and 10 p.m., and last four or five hours, sometimes all night; this is more generally the case between mount Formosa and cape Rachada. There is less calm on the Malayan side than on the Sumatra side of the strait.

**CURRENTS and TIDES.**—Between the western entrance of Malacca strait and Arroa islands the general set of the current is to the north-west all the year round, but near the Malay coast regular tides mostly prevail, except occasionally during the north-east monsoon, when the current sets to the S.E. along the Malay coast. During the south-west monsoon the current runs along the coast of Pedir to the westward, whilst it is setting to the northward between Pulo Rondo and Salanga island. Between Diamond point and the eastern entrance of the strait a tidal influence prevails near the coast.

In the entrance of Malacca strait, between Acheen head and Nicobar islands, the current generally runs with the wind. This, however, is not always the case, for at times the current is found to run obliquely and even contrary to the wind.

From Arroa islands to Carimon islands regular tides prevail throughout the strait; the flood sets to the S.E.; the ebb sets to the N.W., and runs longer and is stronger than the flood; the streams run from 2 to  $3\frac{1}{2}$  miles an hour. Near Arroa islands the flood is often weak, and during neaps there is a constant current setting to the north-west.

The flood setting to the south-east past Carimon islands meets between the north end of Little Carimon island and Tree island, the flood setting from China sea through Singapore strait; after this junction the flood sets to the southward through Durian strait.

In most parts of Malacca strait the streams run 2 to 3 hours after high and low water by the shore. The greatest rise and fall is 15 feet.\*

#### GENERAL DIRECTIONS.

The navigation of Malacca strait is, with ordinary caution, not dangerous, the channels are mostly spacious and have good anchorage, but due attention to the set of the currents and tides is requisite. The passage is much facilitated by keeping under way at night, for steady breezes then often prevail, calms and faint airs being experienced during the day;

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\* It appears that there (Malacca strait), as on the coasts of Scinde, Guzarat, Concan, and other parts northward of the Equator, the principal or highest tides are in the day during the south-west monsoon, when the sun is near the northern tropic; and the highest tides at these places happen in the night during the north-east monsoon, when the sun is in the southern hemisphere.—*Horsburgh's Directory*, vol. 2, p. 110.

passages are thus made without anchoring more than once or twice. The passage to the north-west is generally made in a shorter time than the one to the south-east. Vessels which sail well will, by taking every advantage of the favorable shifts of wind, gain ground during neap tides against the tide or current, with a moderate working wind in most parts of the strait; to this exception must be made in the narrow part of the strait, where the tides run strongest. A stream anchor ready for tidal use will be found convenient in most parts of the strait.

**Approaching from the WESTWARD during S.W. MONSOON.**—A sailing vessel from Ceylon during the south-west monsoon should steer so as to pass between Pulo Rondo and the south end of Great Nicobar island, carefully taking every opportunity of verifying the ship's position, as the currents during this season are strong and uncertain. Vessels set to the southward, which is not an uncommon occurrence when there is much westing in the monsoon, may pass between Acheen islands, by one of the passages to be hereafter mentioned, but with a steady and commanding breeze Bengal passage is the best.

A vessel bound to Acheen should in this season keep well to the southward to make Acheen head, then with great care she may proceed through Surat passage or through Cedar passage (see page 11.) At a considerable distance Acheen head appears like a steep hill, Pulo Gomez then resembles two paps, the western point of the island being very low.

When to the eastward of Pulo Way the monsoon will most likely fail, but vessels should endeavour, by the aid of the variable winds, to sight Pulo Buton and then keep on the Malayan side of the channel, where, as already stated, a tidal influence prevails, and where there is less calm, but generally variable winds, or land and sea breezes. Sometimes a brisk westerly wind will be carried as far as Penang. When once the islands on the Malay coast are sighted there will be no difficulty in getting to the south-east.\*

In the entrance of Malacca strait near Nicobar islands and Acheen islands, and between them and Salanga (Junkseylon), there are often very strong and noisy rippings, particularly in the south-west monsoon. These

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\* Some navigators prefer the track from Pulo Rondo along the coast of Sumatra to Diamond point, and thence to Pulo Varela and Arroa islands. Speedy passages have sometimes been made both early and late in the season, by keeping near the Pedir coast to benefit by the land and sea breezes which prevail only near the shore. Light airs and calms prevail in the offing, and as the current is generally setting to the westward along the coast during the south-west monsoon, it is necessary to keep within the anchoring ground in many places within one or 2 miles of the shore. This track is now seldom pursued, as, in addition to the baffling winds and westerly currents, it is subject to dangerous lightning, and sudden and severe squalls from the land during the night.—*Horsburgh's Directory*, vol. 2.

rippplings occur when there is no perceptible current, and in calm weather are seen approaching from a considerable distance ; in the night their noise gives warning of their approach ; their spray sometimes breaks on a vessel's deck.

After passing to the westward of Pulo Buton, at any convenient distance, 10 to 20 miles, and not being bound to Penang, a course should be steered to pass nearly midway between Sambilang islands and Pulo Jarra. With a working wind the west side of Penang may be approached to soundings of 10 or 12 fathoms ; Great Kra flat and the bank which skirts the coast to Pulo Dinding, and extends seaward 10 or 12 miles, may be approached to the same depths, guarding against the indraft of the rivers on the flood tide when near the bank. Under 15 fathoms the water shoals rapidly to the edge of the bank. Sambilang islands and Pulo Jarra have deep water within a short distance, and may be seen from a distance of 20 miles. In this track, so far, soundings of 28 to 34 fathoms will have been found.

After passing Sambilang islands the vessel should make for the North sands and steer a course to pass 5 or 6 miles to the westward of the north extreme ; the soundings will then decrease from 28 or 30 fathoms to 10 or 15 fathoms. In this depth during daylight Arroa islands will probably be sighted, when, guided by the bearing of these islands and the soundings, the vessel may pass along the west side of the sands until One-fathom bank lighthouse be sighted. Steer a course to pass 2 miles westward of the lighthouse.

Round Arroa island, having trees on its summit, may be seen a distance of 15 miles from the deck.

When the winds incline from the East or E.S.E., keep near the Malay coast in soundings of 20 or 30 fathoms, until 25 or 30 miles past Sambilang islands, then steer more southerly to get soundings of 16 or 18 fathoms on the north-west edge of North sands ; keep in these soundings, rounding the edge to the south-west until Arroa islands and Parcelar hill are sighted ; from the masthead both may be seen when on the north-west edge of North Sands.

**Working.**—With a foul wind it is advisable to keep near the western edge of North Sands, making short tacks to the westward and approaching the edge of North Sands to 10 or 11 fathoms. One-fathom bank light, which is visible 13 miles, should not be brought to bear southward of S.E. by S. until within a distance of  $\frac{1}{2}$  miles, when this bearing is no longer available as One-fathom bank, with its outlying shoal-head of  $4\frac{1}{2}$  fathoms extends that distance to the north-west. By keeping near the edge of the sands more moderate depths will be found for anchoring, and more regular tides ; to the westward a north-westerly current often prevails, especially during neaps. On the North Sands during springs

the flood sets S.E. and the ebb N.W. at the rate of 3 to  $3\frac{1}{2}$  miles an hour, and run two or three hours after the times of high and low water. During neaps the tides are weak and irregular. Much caution is therefore requisite in navigating this part.

Vessels drawing less than 20 feet may work across the sands which lie between Blenheim shoal and One-fathom bank by keeping Parcelar hill between the bearings E.S.E. and E.  $\frac{1}{4}$  S. The north-west end of One-fathom bank is marked by a red buoy.

**The Track.**—Having passed One-fathom bank the vessel should steer to approach the coast in the vicinity of Parcelar hill to 6 or 7 miles in soundings of 17 to 20 fathoms. Parcelar hill lies at a distance of 4 miles from the coast; when abreast of the hill steer to pass 6 miles outside cape Rachada, which in the distance appears like an island. Cape Rachada light is visible 26 miles; it should not be brought to bear eastward of E.  $\frac{1}{2}$  S. in order to clear Pyramid shoal, nor southward of S.E. by E.  $\frac{1}{2}$  E. to clear Bambek shoal. From cape Rachada steer to pass 4 or 5 miles outside Water islands, and in soundings of 20 to 26 fathoms; this course will lead 7 miles north-eastward of Raleigh shoal, and about 10 miles north-eastward of Rob Roy bank. From Water islands steer to pass between Long and Fair channel banks and 5 miles outside Pulo Pisang; thence through Singapore strait, passing north of Tree island. See China Sea Directory, vol. i., p. 298.

**Working.**—In working to windward in the neighbourhood of Parcelar hill do not stand more than 10 miles off the land in order to give a good berth to South sands, which should be approached with care, as they are steep-to. To the westward of Parcelar hill the land may be approached to one or 2 miles, but a vessel should guard against the indraught of Callam strait. North-eastward of Bambek shoal the shore may also be approached to one or 2 miles. Cape Rachada light, as before remarked, kept between the bearings S.E. by E.  $\frac{1}{2}$  E. and E.  $\frac{1}{2}$  S. will lead clear of Bambek and Pyramid shoals.

It is not advisable for large vessels to exceed the distance of 10 or 12 miles from the Malay coast. In judging the distance from the coast the soundings are so irregular as to afford no guide.

After passing Water islands and Rob Roy bank there may be said to be no danger in the channel until mount Formosa is approached. Vessels may stand safely over towards the Sumatra shore and to a distance of 15 or 16 miles from the Malay coast; by keeping the lead going, sufficient warning is given of approach to the mud flat skirting Malay coast. Pulo Bucalisse is low and woody, and may be approached at its north-eastern side to 4 or 5 miles, the lead being a sufficient guide when to tack.

Abreast Long bank the channel for large vessels is narrowed to 11 miles. If Pulo Pisang be seen, keep it between the bearings E. by S. and



S.E. by E.  $\frac{1}{2}$  E. In standing towards the Malay coast, the soundings on Fair-channel bank are a good guide, and on a nearer approach to Pulo Pisang vessels may stand farther over towards the Sumatra shore, being guided by the soundings on the ridges. From Pulo Pisang to Tanjong Bolus the channel is comparatively clear, and guided by the soundings vessels may safely approach either side, taking care to avoid the spit which extends 5 miles to the south-east of Pulo Pisang, and which is steep-to. The shore between Pulo Cocob and Tanjong Bolus should not be approached within  $2\frac{1}{2}$  miles; do not shoal less than 17 fathoms.

**Tides.**—Near cape Rachada, where the strait suddenly becomes narrowed to 20 miles, the tides run strong, and with eddies during springs. In the offing between Water islands and Carimon islands the tides set fair through the strait, except near Pulo Pisang, when the flood sometimes sets a vessel towards Carimon islands.

**Approaching from the WESTWARD during the N.E. MONSOON.**—Vessels from Ceylon are recommended to pass close to south end of Great Nicobar island if the wind permit. Those from Madras should pass through Sombrero channel (Nicobar islands). When within the strait they should endeavour to get near the Malay coast as soon as possible, where there are tidal streams and more favourable winds. A heavy swell rolls on the Sumatra coast during the north-east monsoon. The passage from Ceylon during this season is generally a tedious one, occupying 20 to 30 days.

**FROM the EASTWARD during the S.W. MONSOON.**—Vessels bound through Malacca strait to Ceylon during the south-west monsoon should, with a favourable wind, keep a mid-channel course until Arroa islands are passed, they should then keep a good offing from the Sumatra shore in order to avail themselves of the prevailing north-westerly current and to be out of the tidal influence eastward of Diamond point. From Diamond point to Acheen head, the Pedir coast should be approached in order to benefit by the westerly current adjacent to it. Steer through Bengal passage, keeping close to the north-east side of Pulo Brasse. From a good berth off Acheen islands vessels must endeavour to cross the Equator and pass into the region of the south-east trade wind, a westerly course should then be pursued until on the meridian of the intended port, then a north course may be followed, observing to fall in with the land on the west side of Point de Galle if bound there, for strong westerly winds and easterly currents prevail along the south coast of Ceylon during the south-west monsoon.\*

Some vessels have made the passage to Madras from Acheen head in

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\* *Horsburgh's Directory*, vol. 2, p. 77.

14 or 15 days during the strength of the south-west monsoon, by taking advantage of every favourable change of wind to obtain westing and tack- ing as most convenient. The passage may sometimes be found imprac- ticable by those which sail indifferently by the wind.

**FROM the EASTWARD during the N.E. MONSOON.**—Vessels bound through Malacca strait to Ceylon during the N.E. monsoon usually expe- rience favourable weather and a fair wind. They may pass on either side of Pulo Pera and borrow towards Pulo Rondo or towards the south end of Great Nicobar island as convenient. If bound to Point de Galle the land should be made to the northward of Little Basses.

If bound to Madras, or other part of the Coromandel coast, vessels should keep the Malay coast and its adjacent islands until Salanga island is reached, which may be rounded at a convenient distance. Thence, if early in the season, a course should be steered to pass between Car-Nicobar and Little Andaman islands, or the Sombrero channel may be chosen at discretion if not bound to the northward of Madras. In December and January care must be taken to make the land a little to the northward of the intended port.

**STEAM VESSELS.**—The preceding remarks on passages apply chiefly to sailing vessels ; steam vessels bound from Malacca strait to Aden during the south-west monsoon will find it their interest to gain the Equator as early as possible, without too great sacrifice of westing ; say on a S.W. course, which course should be continued until in latitude  $1^{\circ}$  S. Then steer W. by S. to cross the meridian of long.  $80^{\circ}$  E. on the parallel of  $3^{\circ}$  S. From this position steer West until the long. of  $61^{\circ}$  E. be reached ; then steer to cross the Equator in  $58^{\circ}$  E., and proceed for Ras Hafún, the east point of Africa. By keeping to the southward of the Equator the strength of the current is lessened, and the vessel will pass through a large extent of calm. By re-crossing the Equator so far West the vessel will be in a favourable position to avail herself of both wind and current in entering the bad weather of the south-west monsoon.\*

During the north-east monsoon steam vessels bound from Aden or Ceylon to Malacca strait will naturally take the most direct route.

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\* See Wind and Current Charts for the Pacific, Atlantic, and Indian oceans, published by the Admiralty, 1872.

## CHAPTER II.

## THE SUMATRA COAST.

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 VARIATION in 1876,  $1^{\circ} 40'$  E.
 

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**PULO RONDO** is the northernmost of the islands lying off Acheen head, the north-west point of Sumatra, and is situated in lat.  $6^{\circ} 3' N.$ , long.  $95^{\circ} 13' E.$  29 miles N. by W. from Acheen head. The island is dark-colored, round, 2 cables in diameter, 350 feet high, and steep-to; there are no soundings near it, except on the south side, where also at the distance of a mile are two or three rocky islets 60 to 120 feet above water.

There is said to be a ledge of rocks about 2 miles to the southward of Pulo Rondo.\*

**PULO BRASSE**, north-west end, in lat.  $5^{\circ} 45' N.$ , long.  $95^{\circ} 9'$ , 19 miles S. by W. from Pulo Rondo island, is 8 miles long in a north-west and south-east direction, high and level. Off the north end are four rocky islets, the northern (N.W. islet) is 25 feet high and about  $3\frac{1}{2}$  miles distant, with soundings of 25 to 28 fathoms within a mile. The sea breaks heavily on the other islets, even in moderate weather. There is a passage between the outer and the next rocky islets, but vessels are recommended to pass outside. The current sets very strong to the westward past these islets.

Soundings of 15 to 20 fathoms, sand, will be found within a mile of the north-east and south-west sides of Pulo Brasse, where vessels may occasionally anchor.

**LIGHTS**.—On the north point of Pulo Brasse stands a tower, 120 feet high, which is painted white to a height of 98 feet and red the remainder; from the tower is exhibited at an elevation of 525 feet above the level of the sea a *revolving* white light which attains its greatest brilliancy *every minute*; the light is visible between the bearings of  $E. \frac{2}{3} N.$  (through south and west) and  $N.W. \frac{1}{2} N.$ , and in clear weather should be seen from a distance of 30 miles; within a distance of 12 miles a faint continuous light is seen.

From the same tower, at a height of 26 feet above the ground, is (or will shortly be) exhibited a *fixed red* light visible through an arc of  $90^{\circ}$ , the centre of the arc passing over North-west islet; the light is intended to

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\* *Horsburgh's Directory*, vol. 1, p. 714.

warn vessels of their approach to this islet and in clear weather should be visible from a distance of 12 miles.

**PULO NANCY**, nearly joins the south-east point of Pulo Brasse, being separated by a narrow rocky channel of irregular depth, and in which the tides run with great strength. Pulo Nancy is saddle-shaped, and about  $3\frac{1}{2}$  miles in extent; near its west point about a mile off shore is a rock which breaks at half tide, and between the rock and the shore there are 10 to 12 fathoms, outside there are 12 to 16 fathoms. About 3 miles to the eastward of this rock and about half-a-mile off shore is another rock of 3 feet depth, with 6 and 8 fathoms close-to. From the first-mentioned rock the south extreme of Middle island is in line with the northern of the small islets off Middle island, bearing N.W. by W.  $\frac{1}{4}$  W. From the second, or 3-feet rock, the south extreme of the islet off the west end of Stoney islet is in line with a red mark in the cliff near King point; the southern islet off Middle island kept open of the south extreme of Pulo Nancy leads to the southward of this rock. The south-east side of Pulo Nancy is skirted by rocks.

There is anchorage in 6 or 7 fathoms in a bay on the south-side of Pulo Nancy island, about a mile eastward of the west point. Fresh water and firewood may be procured on the west side of the bay.

**Water.**—Fresh water may be obtained on Pulo Brasse and Pulo Nancy, but on visiting these islands caution is necessary, as a boat belonging to the vessel which was under the command of Commander Fell, I.N., was three times fired at from the shore.

**Middle Island** lies off the south side of Pulo Brasse island, between the latter and Pulo Nancy island; off the south side of Middle island, a mile distant, are four small islets, with 9 or 10 fathoms water between them and Pulo Nancy. The bay between the small islets and Pulo Nancy would afford good shelter during a N.W. wind.

**CEDAR or Sedre PASSAGE** is formed between Pulo Nancy island on the north and Pulo Gomez and Stoney island on the south. The channel which lies to the southward of the rocks off Pulo Nancy is about three-quarters of a mile wide at its narrowest part, and has from 15 to 20 fathoms water.

The western point of Pulo Gomez is very low, and has an islet adjoining; breakers extend a considerable distance to the westward of it. The south side of Pulo Gomez is safe to approach.

A rocky patch of 4 fathoms is situated W. by S.  $\frac{1}{4}$  S.  $6\frac{1}{2}$  miles from the west end of Pulo Gomez island; this patch is near the northern extremity of a narrow ridge of soundings of 7 to 10 fathoms (and possibly less), which extends 40 miles in a S. by E.  $\frac{1}{4}$  E. direction.

A reef projects to the north-west from the west end of Stoney island.

Cedar passage is little frequented, although much wider than Surat passage, more free from eddies, and safer for a vessel proceeding to the westward with a foul wind, as she can drift with the tide under sail, taking care to avoid the rocks (already mentioned) off Pulo Nancy island. Stoney island may be approached to within a quarter of a cable on its north-west side.

**ACHEEN HEAD** is a high bluff headland, forming the north-west extremity of Sumatra. At a considerable distance Acheen head appears like a steep hill, Pulo Gomez then resembles two paps, its western point being very low.

King point is the south-west extremity of the promontory of Acheen head and lies about 3 miles to the south-west of the head.

**SURAT PASSAGE** (Selat Arroos) is formed by Pulo Gomez, Stoney island, and Pulo Chinchin on the north-west and the promontory of Acheen on the south-east. The two latter islands are connected by rocks. Between Pulo Chinchin and Acheen head at the eastern end the passage is only 150 yards wide, but has from 12 to 14 fathoms water. Between Pulo Gomez and the mainland the passage is  $1\frac{1}{2}$  miles wide with 12 to 16 fathoms water.

**Directions.**—In approaching Surat passage from the south-west no opening is perceived, the adjacent islands Gomez, Nancy, and Brasse appearing to join the mainland when seen from that direction. To the southward of King point, at the distance of 5 miles, and on the south side of a low green point there is a sandy bay, which at a considerable distance may be mistaken for Surat passage or a strait, the adjacent land being low near the sea, and covered with trees. In this bay, which is lined by a reef fronting the sea, there is a rocky islet, and at its south point two rocks above water, on which rocks the sea breaks; there are 12 to 14 fathoms near the rocks.

Steering for Surat passage, vessels should keep nearer to Acheen head than to the opposite side of the channel, as Acheen head is bold, with regular soundings of 12 to 14 fathoms, sand, at a moderate distance, and temporary anchorage may be found near the shore in 7 to 10 fathoms water. The south side of Pula Gomez island is also safe to approach, but not so bold as the other shores, there being 18 fathoms within half a mile of its south point. If the tide be unfavourable the vessel should anchor near Acheen head until the flood stream makes; the flood sets directly through the passage to the north-east, the ebb in the opposite direction at the rate of 5 to 6 miles an hour at springs in the narrowest



part of the passage; the eddies caused by the rapid tides render steering in this part very difficult for sailing vessels during light winds, and for large vessels is attended with some risk.

**Tides.**—It is high water, full and change, in Surat passage at 8h. 45m., rise 8 feet.

**PULO WAY**, the largest of the islands off Acheen head, lies about 11 miles to the north-east of the head and 13 miles to the south-east of Pulo Rondo island. Pulo Way is about 9 miles long in a W.N.W. and E.S.E. direction, 2 to 6 miles broad, high and mountainous, the highest peak being to the westward; the island may be seen from a distance of 36 miles, its south side is steep-to in most places, there being no change in colour from the deep ocean blue of the water at 2 cables from the shore, but at other parts of the south side there are soundings near the shore. There is a small rock, dry at low water, about half a mile distant from the south-west point. In a bay about a mile deep on the south-east side there are 30 to 60 fathoms, sand, where possibly anchorage may be obtained.

Pulo Way is under cultivation, and there are said to be 300 or 400 inhabitants on the island. There is a sulphur mine near this bay. Fresh water may be procured at the head of the bay near a sandy beach.

**BENGAL PASSAGE**, formed between Pulo Brasse and Pulo Way islands, is about 9 miles wide, and very convenient for vessels sailing from Acheen head to the north-west, as the current generally sets out in that direction, but vessels bound into Acheen road seldom proceed through Bengal passage unless with a steady commanding breeze, there being no anchorage in the passage except near Pulo Brasse. During the south-west monsoon the current sets round Pulo Brasse to the westward frequently at the rate of 25 to 40 miles a day.

**ACHEEN RIVER** falls into the sea by several mouths, separating the low country into islands, which are inundated during the rainy season. The principal mouth, which is situated about 5 miles to the eastward of Acheen head, is about 50 yards wide, and is a foot deep on the bar at low water. At high water, when there is a depth of 8 feet on the bar, vessels of 20 or 30 tons burthen can enter the river. In April the water at the entrance was constantly fresh, as the water was always running out.\*

From a distance the entrance to Acheen river may be known by two trees, one with a mushroom-shaped top, on the eastern bank, and the other a leaveless cocoa-nut tree on the west bank. A house with a flagstaff is situated near the entrance, and a red flag is hoisted on the approach of foreign vessels. The harbour master resides near the river's mouth.†

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\* Lieutenant H. P. Knevitt, H.M.S. *Leven*, 1865.

† Lieutenant H. R. E. Grey, H.M.S. *Algerine*, 1870.

**TIDES.**—It is high water, full and change, at the bar of Acheen river at 8h. 45m.; rise 7 feet at springs.

**Anchorage.**—The usual anchorage off Acheen river is in 8 or 9 fathoms with the entrance bearing S.  $\frac{1}{2}$  E. to S.S.E., distant about a mile. During the south-west monsoon, which prevails from May to October, vessels in this berth are sheltered from wind. During the north-east monsoon the winds are seldom strong, but N.W. winds sometimes blow with great force through Bengal passage, and render the anchorage insecure. In the anchorage off Acheen river land and sea breezes often blow during both seasons, but the land breezes do not extend beyond the islands.

**Town.**—The town of Acheen is situated on the left bank of Acheen river, about 4 miles from the entrance. Plentiful supplies of cattle, poultry, and water could be procured here in 1870, with vegetables and fruit during the proper season. Gold dust, camphor, and small horses of an excellent breed may be obtained. Sheep are scarce.

**MALACCA PASSAGE**, formed between Pulo Way and the Sumatra coast, is 7 miles broad, and has in it the small island Malora, or Pulo Buroo, situated at one third the width of the channel from the Sumatra shore. The passage on either side of Pulo Buroo is safe, but that on the north-west side is deep, whilst that on the south-east has from 9 to 13 fathoms water, but vessels should not shoal less than 10 fathoms in approaching point Pedro.

On the summit of Pulo Buroo there is a solitary cocoa-nut tree, visible 6 or 8 miles.\* A reef projects a quarter of a mile from the east side of the island, and there is a depth of 8 fathoms within half a mile of the shore. Malacca passage is the best route to approach Acheen from the north-east.

**The COAST of PEDIR**, surveyed by Commander W. Fell, I.N., extends from point Pedro in a general E.  $\frac{1}{4}$  S. direction 120 miles to Diamond point, its eastern boundary. This coast is low in several places close to the sea, but the country a little inland is all very high.

During the months of December, February, and part of March, 1851, the weather was generally fine, with little or no rain, the winds varying from N.E. to E.S.E. and S.E., and the thermometer ranging from 79° to 82°. The tides near the shore are regular, but not very strong. In the offing, during these months, there is generally a set to the westward, so that it is advisable for sailing vessels, in proceeding to the eastward during these months, not to go far out of soundings, but keep near the shore, and anchor for the tide, should it not be favourable, taking advantage of the land wind which generally sets in between 8 and 9 p.m., and continues through the night.

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\* Lieutenant H. P. Knevitt, H.M.S. *Leven*, 1865.

The villages along the coast are small, generally containing 60 to 80 huts, which are constructed of bamboos and mats. The men are mostly well dressed, and carry a knife, or kris, in their waist. They are not to be trusted much if any temptation be in the way. Great numbers of the natives go out daily to fish, and the entrances to the different creeks leading to the villages, which are not perceptible from the anchorage, may be found by observing the canoes enter on their return from fishing. It may be generally remarked during this season that if the canoes are not seen out fishing before 7 or 8 a.m. that a fresh breeze may be expected during the day.

On this part of the coast, supplies, such as fowls, eggs, and fruit, are scarce, but goats may be procured. Large herds of cattle were seen grazing on the plain, but the natives have an objection to part with them.

**Water.**—Fresh water may be procured in most of the creeks between Sawang and Telesamoi, but to the westward of Sawang the creeks are all salt water.

**POINT PEDRO** (Tanjong Batoo), the north point of Sumatra, is situated 13 miles E.N.E. from Acheen head, and may be approached to a depth of 9 or 10 fathoms at the distance of a mile. It is low, terminating in a green slope with and having a few trees. A bluff formed by high land is situated  $1\frac{1}{2}$  miles W.S.W. from point Pedro. The bottom in this vicinity is rocky, and the soundings do not extend more than  $1\frac{1}{2}$  or 2 miles from the shore.

**Tanjong Batoo Pootie**, or White cliff, lies E.  $\frac{1}{4}$  S. 9 miles from point Pedro, and may be known by a small tree and a ruin near its extremity; the point is conspicuous when seen from the eastward. Between point Pedro and Tanjong Batoo Pootie is formed Deep Water bay, at the bottom of which is Ryah village, with soundings of 20 fathoms within a quarter of a mile from the shore. The soundings do not in this part extend more than 2 miles from the shore. Tanjong Batoo Pootie is nearly steep-to.

**Batoo Pedir**, 14 miles E.S.E. from Tanjong Batoo Pootie, may be known by some bushy trees on its summit, and by the Golden mountain which bears from the point W. by S.

**DIRECTIONS.**—In sailing from Acheen along this part of the coast a vessel should keep near the shore, as in most parts anchorage may, if necessary, be found, and there is seldom any hidden danger more than half a mile from the shore. Also the bank of soundings is steep-to, with westerly and variable currents outside its limits. Calms are more prevalent than when the vessel is in soundings. Pedir point may be approached to a depth of 10 fathoms at the distance of half a mile. See foot note at page 5.

**Golden Mountain** (Ya Mura), in lat.  $5^{\circ} 29' N.$ , long.  $95^{\circ} 42\frac{1}{4}' E.$ , W. by S. 11 miles from Batoo Pedir, is a high regular cone about 6,900 feet high. There is a smaller mountain about 5 miles to the eastward of the Golden mountain, called the Orphan (Ya Muree), having green sides and darkly-wooded summit. The surrounding country appears well cultivated. These two mountains are useful landmarks. Golden mountain has been seen at a distance of 88 miles.

From Batoo Pedir the coast trends to the south-east to Batoo creek, 4 miles distant, and to Bungala creek, 6 miles distant from the former. Bungala creek may be known by a few tall cassarina trees near its entrance.

**PEDIR CREEK** is situated 8 miles to the south-east of Batoo Pedir. The entrance of the creek dries at low water, and is not easily discovered, but it may be found by steering from the eastward towards the Orphan mountain until a large village is seen in a gap in the trees which line the coast. Two miles to the north-west of the village is Pedir creek. From the entrance the creek winds for a mile and a half, when it becomes so narrow that there is hardly room for a boat. About a quarter of a mile farther up is a village and an old Portuguese fort, mounting 11 guns.\* The exports of Pedir are betel-nut and pepper.

There is good anchorage near the coast in the neighbourhood of Pedir creek about a mile from the shore.

**Burrong Creek.**—The entrance of this creek, which is situated 4 miles to the south-east of Pedir creek, may be known by a flagstaff in the centre of the village. The creek is very narrow, and the bar at its entrance very shallow, only passable at high water. Burrong has become a chief place for trade on this coast; it is much frequented by vessels from Coromandel coast.

Two and a half miles to the south-east of Burrong creek is Ayerlaboo creek.

**SAWANG CREEK.**—The entrance to this creek is situated 17 miles to the south-east of Batoo Pedir cape, and may be known by two groves of cocoa-nut trees situated near the entrance. The bar has a depth of 4 feet at low water, the bottom seaward deepening gradually to 10 or 12 fathoms half a mile off shore. A long spit extends from the north point of the entrance and dries at half tide. The rise and fall of tide is 7 feet.

The village of Sawang, consisting of 200 houses, is situated nearly 2 miles from the bar of the creek, and like other Malay villages is built in a swamp. Small supplies of provisions may be procured.†

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\* Navigating Lieutenant F. J. Gray, H.M.S. *Nassau*, 1872.

† Mr. Benjamin Renaud, Master, R.N., H.M.S. *Amazon*, 1851.

**MURDOO POINT**, lying S.E.  $\frac{3}{4}$  E. 26 miles from Batoo Pedir, is low and sandy with a few small trees; a run of water, resembling when at a distance a path in the valley, appears very plain during the rainy season. A conspicuous grove of trees is situated  $1\frac{1}{2}$  miles to the westward of the point. The village of Murdoo is situated half a mile from the sea on the banks of a small river. The anchorage off Murdoo is in 18 fathoms a mile from the shore, with the village bearing South. The water shoals suddenly from 10 to 2 fathoms.\*

**Sambelangan Creek** (entrance of) is situated  $7\frac{1}{2}$  miles to the eastward of Murdoo point. The entrance cannot be distinguished from the sea, but it is situated  $1\frac{1}{2}$  miles to the westward of two large trees which are near the beach. On either side of the entrance there is a small fort.

The anchorage off Sambelangan is in 12 to 15 fathoms a mile off shore with Murdoo point bearing W. by N., Oujon Rajah point E. by N.

**Oujon Rajah**, a point having a high grove of trees near its extremity is situated in lat.  $5^{\circ} 13' N.$ , long  $96^{\circ} 27' E.$ , and forms with Murdoo point (12 miles to the westward) a bight which off Sabilangan creek is  $1\frac{1}{4}$  miles deep and has a depth of 24 fathoms decreasing gradually towards the shore. Oujon Rajah may be approached to a depth of 10 fathoms; but E.  $\frac{3}{4}$  S.  $2\frac{1}{2}$  miles from the point there is a rocky patch having 6 fathoms water and 12 to 15 fathoms close to.

**Elephant Mountain** or Friar's hood, in long.  $96^{\circ} 37' E.$ , distant 10 miles from the nearest part of the coast, is an isolated and conspicuous landmark, visible nearly 40 miles.

**PASSANGAN POINT and CREEK.**—Passangan point in lat.  $5^{\circ} 16' N.$ , long.  $96^{\circ} 49' E.$  22 miles E.  $\frac{3}{4}$  N. from Oujon Rajah point, is low, sandy with a few cocoa-nut trees near its extremity, and is in line with Elephant mountain bearing S.  $42^{\circ} W.$  Between Oujon Rajah point and Passangan point the shore may be approached to a depth of 14 fathoms. Passangan point is steep, there being 30 fathoms within half a mile of the beach.

There are two entrances to Passangan creek; the principal one is situated 4 miles to the westward of the point, the other half a mile eastward of the point; both entrances are shallow and only passable by boats at high water.

**Agum-Agum** point is distant  $9\frac{1}{2}$  miles E.  $\frac{3}{8}$  S. from Passangan point the coast between forming a bight, the shore of which may be approached to 10 fathoms. Agum-Agum point is low with a little jungle on it and vessels should not shoal less than 14 or 12 fathoms in approaching it. Four and a half miles to the westward of Agum-Agum point there is a high square grove of trees and  $2\frac{1}{2}$  miles to the eastward of the point a belt of high

\* Mr. Benjamin Renaud, Master, R.N., H.M.S. *Amazon*, 1851.

cassarina trees commences and continues nearly as far as Telesamoi, which is distant 12 miles from Agum-Agum point.

**Krung-Koqua** is a village near a creek which is situated 4 miles to the eastward of Agum-Agum point. There is good anchorage westward of the village in 10 fathoms mud; there are 4 fathoms close to the breakers.\*

**TELESAMOI VILLAGE**, in lat.  $5^{\circ} 10'$  N. long.,  $97^{\circ} 10'$  E., is situated in a bay about 20 miles to the westward of Diamond point and contains about sixty huts and a mud fort having a few old guns. The village in which the Rajah's flag is hoisted is on the south side of the creek of Telesamoi, the entrance of which is dry at low water; the village is only approachable in a boat at high water.\* Telesamoi may easily be recognized after a first visit by a remarkable ridge of hills which are 4 miles long, 300 to 500 feet high, and commence a short distance west of Telesamoi; these hills are cleared of trees and the light green grass renders them distinguishable. A rounded piece of land called Telesamoi point is marked by a clump of tall cassarina trees which are easily seen on a southerly bearing.

Entering the bay from the north-west the shore may be approached to any convenient distance as there are soundings of 7 and 10 fathoms within 100 yards of the beach. There is good holding ground in 10 fathoms stiff blue mud about half a mile from the north-western shore of the bay; but the anchorage is exposed during the north-east monsoon and there is no shelter from the sea breeze; there is shelter for small coasting craft inside a spit.

**Tides.**—It is high water at Telesamoi at 12 h.

**Supplies.**—Water and provisions may be obtained at Telesamoi, but vessels should be on their guard against the natives, who, together with the natives of other villages on this coast, are reputed to be treacherous.

**DIAMOND POINT or JAMBIE AYER.**—The coast from Telesamoi extends in an E.N.E. direction 21 miles to Diamond point, which together with the intervening coast, is low, flat, and covered with trees; but the trees on Diamond point being of unequal height and higher than those on the adjacent land makes the point appear like a low, sloping island when seen at a considerable distance, although the ground is very little elevated above the level of high-water spring tides. A high table mountain visible from the offing in clear weather is situated S.S.W. from Diamond point.

Several rivers fall into the sea between Telesamoi and Diamond point. "The character of these rivers which run through the alluvial plain," remarks Lieutenant H. R. E. Grey, R.N.,† "appears nearly always the same, namely, a bar at the entrance, only passable by very small vessels, and deep water clear of dangers in the river itself."

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\* Navigating Lieutenant F. J. Gray, H.M.S. *Nassau*, 1872.

† H.M.S. *Algerine*, 1870.

**Shoals.**—The coast may be approached to soundings of 7 fathoms, except near Diamond point, where on a bearing West  $5\frac{1}{4}$  miles from Diamond point is a shoal of 12 feet clay. The shoal is not more than 20 yards in extent and has 7 fathoms close to. From the shoal a small gap in the jungle bears S.  $1^{\circ}$  E. and Cartoy Creek (which is at the west extreme of a thick belt of jungle) S.S.W. This place is much frequented by fishermen during fair weather.

A spit extends from Diamond point nearly a mile in a northerly direction; it has a depth of 18 feet on its outer edge, deepening suddenly to 8 and 15 fathoms, and therefore vessels should not shoal less than 10 fathoms in approaching the spit, especially during the north-east monsoon, when a heavy swell will be experienced. This depth will be found at a distance of  $2\frac{1}{2}$  miles to the northward of the point; at 3 miles there are 20 fathoms, deepening but not very regularly to 30 and 40 fathoms at 10 miles from the shore.

**Tides.**—It is high water, full and change, at Diamond point at 12h. springs rise  $9\frac{1}{2}$  feet. The flood sets to S.E., the ebb to the N.W. at the rate of 2 miles an hour. On the coast westward of Diamond point, as before remarked, the tidal streams are not strong.

**The COAST from DIAMOND POINT to BREWERS STRAIT.**—From Diamond point to Arroa islands the coast is low and woody, and has several rivers, towns, and villages scattered along it. From 40 to 50 miles in the interior is a high chain of mountains, which may occasionally be seen in clear weather. The principal towns are Prauhilah, Lanksa, Sampai, Lankat, Dehli, Batoo Barra, and Assarhan, but these places are but collections of miserable huts, and their inhabitants remarkable neither for industry nor honesty. It is recommended that vessels when meeting with native proas be on their guard, as their piratical depredations are not always confined to native coasting vessels.

The shore is often difficult of approach on account of shoals, which in some places extend a distance of 8 or 9 miles to seaward. Towards these shoals, however, the soundings are generally a guide; the bottom consists of mud, sand, or sand and mud mixed.

**Tides.**—The flood tide sets along the coast to the S.E., and the ebb to the N.W., but varying a point or two according to the direction of the coast. At springs the tides set at the rate of 2 or 3 knots, but they are greatly influenced by the prevailing winds. The ebb is generally stronger and of longer duration than the flood, but, when the distance from the shore is considerable, seldom exceeds  $1\frac{1}{2}$  knots.

**Winds.**—Regular land and sea breezes are experienced on this part of the coast in February, March, and April.

During the strength of the north-east monsoon this coast ought not to be approached, there being a heavy swell rolling on it at that time.

**PAUHILAH POINT** (Oujong Prauhilah.)—The coast between Diamond and Prauhilah points extends in a south-east direction and is nearly straight; it is safe to approach to soundings of 10 fathoms, which depth will be found at a distance of 2 miles from the shore, except near Prauhilah point, from which a reef extends N.N.E. and N.N.W. a distance of 4 miles. There is a depth of 10 fathoms 5 miles north and 4 miles N.N.E. from the point, outside which the water deepens quickly to 20 and 25 fathoms. Eastward of the point there are 4 fathoms at  $2\frac{1}{2}$  miles distant, and 10 fathoms at  $3\frac{1}{2}$  miles.

The entrance to Prauhilah river is on the north side of Prauhilah point, and is almost dry at low water, but inside there is a depth of 12 feet for several miles up, and it is said to have communication with Quala Lagoo. A small fishing village is situated at a considerable distance from the entrance of the river.

**LANKSA BAY.**—The coast to the southward of Prauhilah point, as far as Raya river, is safe to approach to a depth of 5 fathoms at a distance of  $1\frac{1}{2}$  miles from the shore; thence to Oujong Praulin, the north-west point of Lanksa bay, vessels should not shoal less than 16 or 20 fathoms, as reefs on which the sea breaks heavily, project from Oujong Praulin a distance of  $4\frac{1}{2}$  miles to the northward and eastward. Praulin point is low, but can be distinguished on any bearing from S.W. by S. round to the southward. With the point bearing South a vessel should not, in approaching the reef, shoal less than 10 fathoms. The eastern part of the reef should not be approached nearer than soundings of 19 fathoms.

Lanksa bay is formed between Oujong Praulin on the north-west side and Oujong Lanksa on the south-east; the distance between these points is  $4\frac{1}{2}$  miles, and the depth of the bay is also about  $4\frac{1}{2}$  miles. It contains numerous shoals, between which there are narrow boat-channels leading into the various rivers that discharge into this bay. Near Oujong Lanksa, but separated by a channel 300 yards wide and 5 fathoms deep, lies Pulo Laga Tojoo, a small island about a mile in extent, and having a reef which extends from it three-quarters of a mile to the northward and eastward. This island can only be distinguished from the mainland in coming from the south-east.

The entrance to Lanksa river bears South (nearly) from Pulo Laga Tojoo; there is a narrow channel on the north side of that island, but the best channel to the river is south of Pulo Laga Tojoo and has 9 feet least water. These channels, however, are only practicable for vessels of very small draught, and, as there are no leading marks, boats should be kept



ahead sounding. In the entrance of the river lies Pulo Rawa, an island about half a mile in extent, after passing which the river is only 300 or 400 yards wide. The town is said to be at a considerable distance (about three hours pull) from the entrance of the river; the inhabitants cultivate rice, pepper, and rattans.

A vessel intending to send her boats to Lanksa should anchor in 9 or 10 fathoms water, with Oujong Lanksa bearing S.W. by W. distant  $3\frac{1}{2}$  miles.

From Oujong Lanksa the coast extends S.E. by E.  $\frac{1}{4}$  E. 15 miles to Oujong Tamiang; midway there is an island named Pulo Roquit, which is safe to approach on the north-eastern side to soundings of 10 or 12 fathoms. Between Pulo Roquit and Oujong Lanksa the shore is skirted by a bank, which extends one or 2 miles off shore, and has from 12 to 18 feet on its edge; the soundings decreased very gradually towards the bank. South-east of Pulo Roquit vessels should not approach the shore with less soundings than 17 fathoms, and off Tamiang to 20 fathoms, as the skirting bank is steep.

**OUJONG TAMIANG** is in lat.  $4^{\circ} 25' N.$ , long.  $98^{\circ} 16' E.$ ; a reef projects from the point in a N.N.E. direction one mile, and has 18 or 20 fathoms close to its edge; another reef, on which the water shoals very suddenly, extends N.W. by N. from the point. The point should not be approached nearer than 2 miles on account of the strong undercurrents, which are likely to set the vessel into the small bay which is formed to the westward of Oujong Tamiang.\*

**Tamiang river**, west of Oujong Tamiang, has a depth of 4 feet on its bar at low water. The town of Tamiang is situated about 10 miles up the river, which has a rise of 2 feet at the town. There is a dangerous reef off the point to the southward of the entrance.†

**Tides.**—It is high water, full and change, off Oujong Tamiang at Oh. 30m., rise of tide 6 to 9 feet. The water is quite fresh on the surface to a distance of 2 miles from the shore.

**Soundings.**—There is a bank of small extent bearing E. by N.  $\frac{3}{4}$  N.  $4\frac{1}{2}$  miles from Oujong Tamiang. The least water found on the bank was 13 fathoms: there are 20 and 23 fathoms close to.

The coast between Oujong Tamiang and Pulo Tapaconda forms a bay about 30 miles broad and 9 miles deep. Nearly in the bottom bay are two large islands: the northern one is called Pulo Sampai, on the south extreme of which is a small town of the same name belonging to the Rajah of Acheen.

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\* The surveying vessel *Krishna*, in December 1859, anchored about half a mile from the breakers and with Tamiang point bearing S.  $28^{\circ} E.$ , distant  $2\frac{1}{2}$  miles. On weighing with an ebb tide which was apparently setting to N.E. 2 knots on the surface of the water, the vessel was observed to drift towards the reefs, and it was only on the fourth day, by kedging in deep water, that she could be extricated from this dangerous position.—Lieutenant Henry Jackson, H.M.I.N.

† Lieutenant H. R. E. Grey, R.N., H.M.S. *Algerine*, 1870.

This bay is fronted by mud-banks which extend in some places 5 and 7 miles off shore, towards which the soundings decrease very gradually; the banks may be safely approached to 6 fathoms, excepting near Tamiang point and to the northward of Lankat river.

**Pulo Sampai.**—Leading to Pulo Sampai there is a safe channel, at the entrance of which, bearing from the south extreme of Pulo Sampai N.E.  $\frac{1}{2}$  E.  $6\frac{1}{2}$  miles, there are 9 feet least water. Thence the channel, nearly straight to Sampai, is about half a mile in breadth, and has deep water. The channel is said to continue to Kaya-la-pun river; this however was not ascertained by Lieutenant Jackson as the Rajah of Sampai objected to surveying operations being carried on westward of the town.

**Pulo Tapaconda.**—Pulo Tapaconda is a small islet covered with trees off the mouth of Tapaconda river; the southern extreme of the islet is in lat.  $4^{\circ} 0' N.$ , long.  $98^{\circ} 32' E.$  On the west side of the entrance to Tapaconda river there is a clump of trees.

**LANKAT RIVER.**—The entrance to Lankat river is about 3 miles westward of Pulo Tapaconda. From the entrance of Lankat river a bank with dry patches in some parts extends north and north-east 5 or 6 miles. A vessel should not shoal less than 11 fathoms in approaching this bank from the north, and 12 or 14 fathoms from the north-east, as the soundings decrease very suddenly inshore of those depths.

To the north-east of Pulo Tapaconda 5 miles and east of the same island 6 miles the soundings are 12 and 13 fathoms. Within these distances there is a bank of irregular soundings, 3 to 9 fathoms; over the northern part of this bank it is safe to pass.

The coast from Pulo Tapaconda to Oujong Betin Chama forms a slight bay and is fronted by extensive banks; it may, however, be safely approached to soundings of 10 fathoms.

**Oujong Beltin Chama**, in lat.  $3^{\circ} 54\frac{1}{2}' N.$ , long.  $98^{\circ} 40' E.$  forms the northern extreme of the bay on which Dehli river is situated and bears from Tapaconda island S.E. by E. 10 miles distant. The point should not be approached nearer than soundings of 10 fathoms.

**BALAWAN and DEHLI RIVERS.**—Dehli river entrance in lat.  $3^{\circ} 46' N.$ , long.  $98^{\circ} 42' E.$  is about 300 yards broad and fronted by an extensive shoal bank to the distance of 4 and 5 miles; towards the bank the soundings decrease very regularly. The entrance to Balawan river is a mile N. by W. from that of the Dehli. Balawan and Dehli rivers, so called, communicate with each other by a channel having 9 to 12 feet water, and form an island; the adjacent land is low and wooded. The entrances to the two rivers are divided by a sand-bank almost dry at low water, and cannot easily be distinguished.

Balawan river entrance is marked by fishing stakes and by beacons 4 feet above high water on either side of the entrance; the beacons on the

starboard hand (entering) are white with round basket tops; those on the port hand are black and surmounted by crosses. The bar of the river has a depth of 8 feet at low water with 3 to 5 fathoms inside.\* By keeping the white beacons about a cable distant on the starboard hand the passage is easy, and there are no dangers in the river up to the anchorage except one shoal, on the outer edge of which there is a beacon. The best anchorage is in the fork of the river in about 21 feet water, near the coal sheds. Above the junction of the Balawan and Dehli rivers the river is very shallow, and at low water only navigable for the smallest boats; but above the town of Dehli or Labuan the river deepens and is navigable for large boats for many miles.†

Dehli river entrance may be discovered in line with a remarkable gap in the mountains bearing S.W.  $\frac{1}{2}$  W., and may be known by the numerous fishing stakes in its neighbourhood. About 4 miles to the southward of the entrance there is a conspicuous group of high trees.

Vessels proceeding to the town of Dehli (about 3 miles up the river) enter through Balawan river as it is deeper than Dehli river which has only 4 feet on its bar and is very shoal inside. A Malay village is situated near the entrance of Dehli river and pilots are there procurable.

Dehli is a small village in the possession of the Dutch, and in 1873 was rising in importance. Tobacco is the principal article cultivated. Ponies and bullocks may be procured.

**Outer Anchorage.**—Vessels should anchor in 9 fathoms, with the entrance of Dehli river in a line with a gap in the mountains bearing S.W.  $\frac{1}{2}$  W., about  $6\frac{1}{2}$  miles from the entrance.

**Tides.**—It is high water, full and change, in Balawan river at 3h.; rise of tide 7 to 10 feet.‡ The tidal streams run from one to two hours later.

**Oujong Bungan Bungan.**—From Dehli river the coast extends in an E.S.E. direction 17 miles to Oujong Bungan Bungan, and may be approached in any part with sounding of 6 fathoms. Oujong Bungan Bungan may be known from the offing by its grove of high trees, the third grove from Dehli river.

**DEHLI BANK** is about 23 miles in length. N.W. and S.E., and varies from 2 to  $4\frac{1}{2}$  miles in breadth. Its south-east extreme is in latitude  $3^{\circ} 42' N.$ , long.  $99^{\circ} 5' E.$ , with the following bearings:—Pulo Varela peak N.  $80^{\circ} E.$  (*true*), a high tree on the northern extreme of a long straggling grove to the south-east of Oujong Bungan Bungan S.  $27^{\circ} E.$  (*true*), the grove on Oujong Bungan Bungan S.  $67^{\circ} W.$  (*true*.) The north-west extreme of the shoal is in latitude  $4^{\circ} N.$ , long.  $98^{\circ} 50' E.$ , and has from 7 to 11 fathoms.

\* In May 1873 Commander J. F. G. Grant, R.N., H.M.S. *Midge*, crossed the Balawan bar in a boat, and found 4 or 5 feet water, with 5 to 9 fathoms inside.

† Remarks on Balawan river by Commander F. Stirling, H.M.S. *Thistle*, July 1875.

‡ According to later information, derived from a sketch of Balawan river by the officers of the Dutch corvette *Waterguese*, the rise is said to be about 5 feet.

**BUNGAN SHOALS**, which form the dangerous part of Dehli bank, are situated on the southern extreme of the bank, and consist of two narrow ridges of sand, which are 3 to 4 miles long in a N.W. and S.E. direction, half a mile broad, lie nearly abreast of each other, and are separated by a channel which is 2 miles wide, and has 6 to 9 fathoms water.

The least water on the western ridge is 6 feet, from which spot Pulo Varela peak bears N.  $85^{\circ}$  E. (*true*), distant 26 miles; a high tree on the north extreme of a long straggling grove to the south-east of Oujong Bungan Bungan, S.  $32^{\circ}$  E. (*true*), 13 miles, and the grove on Oujong Bungan Bungan, S.  $46^{\circ}$  W. (*true*),  $6\frac{1}{2}$  miles.

On the shortest part of the eastern ridge there is a depth of 9 feet, from which part Pulo Varela peak bears East (*true*) distant 25 miles; a high tree on the north extreme of a long straggling grove to the south-east of Oujong Bungan Bungan, S.  $23^{\circ}\frac{1}{2}$  E. (*true*),  $14\frac{1}{4}$  miles; and the grove on Oujong Bungan Bungan, S.  $40^{\circ}$  W. (*true*), 9 miles.

Pulo Varela peak bearing E.  $\frac{1}{4}$  S. leads to the northward of Bungan banks, and the same object bearing E. by N.  $\frac{1}{8}$  N. leads to the southward of them. The high tree\* on the north extreme of a long straggling grove of trees to the south-east of Oujong Bungan Bungan, bearing S.  $20^{\circ}$  E., leads to the eastward, but this tree can only be seen in clear weather. The centre of the grove on Oujong Bungan Bungan bearing S. by W. will lead in 5 fathoms to the north-west of Bungan shoals, and clear of all dangers on Dehli banks. A vessel drawing less than 24 or 25 feet may pass over all other parts of Dehli bank without danger. It is not advisable to shoal less than 18 fathoms in passing these banks at night-time.

There is a clear channel,  $3\frac{1}{2}$  miles wide and having  $5\frac{1}{2}$  to 10 fathoms water, between Bungan shoals and the coast, but the shore to the southward of Oujong Bungan Bungan should not be approached nearer than 3 miles, as there is a bank having 9 to 12 feet water extending parallel to the shore for  $5\frac{1}{2}$  miles; there is deep water between this bank and the shore.

From Oujong Bungan the coast extends S.E. by E.  $\frac{1}{2}$  E. 35 miles to point Mattie, and may in most places be approached to 2 or 3 miles in from  $4\frac{1}{2}$  to 7 fathoms water, but the soundings outside are very irregular, with overfalls. There are several rivers in this part of the coast, the entrances to which are passable only for boats.

**Point Mattie.**—The north-east extreme of this point, in lat.  $3^{\circ} 21' N.$ , long.  $98^{\circ} 28\frac{1}{2}' E.$ , forms the northern extreme of Batoo Barra bay, and may easily be known by its high grove of trees. Five miles northward of point Mattie the soundings are from 12 to 14 fathoms, and thence to the

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\* This high tree is among a small cluster, and is very little higher than the adjacent trees. The foreground is low and deceptive in appearance, being backed by a range of mountains which have many peculiarly-shaped peaks.—Navigating Sub-Lieutenant G. F. Whitmore, R.N., H.M.S. *Midge*, 1873.

southward shoals very suddenly to 5 and 2 fathoms on a sandy spit dry at low water, and which extends from Mattie point one mile to the north and north-east.

**Tides.**—It is high water, full and change, off point Mattie at 3 hours ; springs rise 7 to 10 feet. The tidal streams run from one to two hours later, and set at the rate of 2 to 3 miles an hour at springs.

**MATTIE SHOAL** is a dangerous sand-bank 6 miles long, in an E.S.E. and W.N.W. direction, one mile broad, and having from 6 to 12 feet water. There is a safe channel between the shoal and the mainland, the narrowest part,  $1\frac{1}{4}$  miles, being off point Mattie. From the north-west extreme of Mattie shoal Pulo Varela peak bears North (*true*), Point Mattie S. 26 W. (*true*), Pulo Pandan peak N.  $81^{\circ}$  E. (*true*).

A mile southward of the south-east extreme of Mattie shoal is a small patch having 16 feet water. It is easily cleared by attending to the bearings of Pulo Salanama and a remarkable tree near Batoo Barra.

**Batoo Barra river.**—The entrance to this river, situated  $9\frac{1}{2}$  miles S.E. from point Mattie, is fronted by a mud flat which extends a considerable distance north-west and south-east, and, within a depth of 18 feet, is from 2 to 4 miles off shore ; this flat has regular soundings, and extends to within  $4\frac{1}{2}$  miles of Pulo Salanama. A wide-spreading remarkable tree is situated about  $1\frac{1}{4}$  miles to the westward of the entrance of the river.

Batoo Barra river is about 300 yards wide, with regular soundings to the dry banks at its mouth. At a short distance from the entrance the river divides into two branches, one to the eastward and the other to the westward ; these branches are mere creeks and are almost dry at low-water. About a mile up the western branch is a town where the chief rajah resides ; on the banks of the eastern branch is another town, and there are said to be other towns farther up the river. The people cultivate rice and rattans. Elephants abound inland, but the natives are ignorant of the method of catching them ; horses also are plentiful. Goats and poultry may be procured at reasonable prices.

European vessels discontinued visiting this place for many years, owing to the perfidious conduct of the Malays who cut off several vessels which touched here to trade. Nevertheless the people of Batoo Barra appear more industrious and inclined for trade than is usual with other inhabitants along the coast ; and they carry in their proas to Penang and Malacca the ratans, pepper, and other articles produced here.

**PULO VARELA** is high, with a peak, and may be seen in clear weather at a distance of 28 miles : its peak is in lat.  $3^{\circ} 46' N.$ , long.  $99^{\circ} 29' E.$ , and about 22 miles from the nearest part of Sumatra shore. Off the north-west point lies an islet or rock, and another off the south end, but which is

joined to the island at low water by a narrow neck of land. At the south end of Pulo Varela, in a little cove, water may be procured from a small run; there is anchorage a mile off the south-east part of the island in 12 to 18 fathoms. The soundings near the island on the inside are 18 to 29 fathoms, and towards Bungan banks 25 to 18 fathoms.

Plenty of firewood, and good pine spars may be cut here, but boats landing should be on their guard against the Batoo Barra people from the adjacent coast, who frequently lurk about the island in their proas in search of plunder, or else to dry their nets, and they have more than once massacred or carried into captivity the crews of boats who have landed here to procure wood and water.\*

**Banks.**—To the northward of Pulo Varela is a bank having 6 to 10 fathoms water; its south extreme bears N. by W.  $\frac{1}{2}$  W. 7 miles from Pulo Varela, the bank thence extends in a N.W.  $\frac{3}{4}$  W. direction for 7 miles, and is a mile broad. It has been stated that there is a depth of only 2 fathoms on some parts of this bank, but 6 fathoms was the least water found by the officers of the *Krishna* during their survey in 1860.

Another bank, having 8 to 10 fathoms, lies with its north extreme bearing S.W. by W. 4 miles from Pulo Varela, and thence extends in a S.E. direction  $5\frac{1}{2}$  miles, with a breadth of  $1\frac{1}{2}$  miles.

A third and very extensive bank has its northern extreme bearing from Pulo Varela S. by W. 13 miles; its south extreme bears from Pulo Pandan W.S.W. and N.W.  $4\frac{1}{2}$  miles from Pulo Salanama. Five fathoms was the least water found on this bank, the shape of which is irregular, being about 17 miles long in a general N.W. and S.E. direction, and 2 to 5 miles broad. Between the bank and Mattie shoal there are 12 to 20 fathoms.

**The BROTHERS** are two small wooded islands lying N.N.E. and S.S.W. from each other, a quarter and half a mile long respectively, and may be seen from a distance of 15 miles. The northernmost, called Pulo Pandan, is in lat.  $3^{\circ} 25' N.$ , long.  $99^{\circ} 45' E.$ , and bears from Pulo Varela S.  $36^{\circ} E.$  (*true*) 26 miles; this island is encircled by shoal and rocky ground to the distance of half a mile. The southernmost, called Pulo Salanama, bears S.  $21^{\circ} W.$  (*true*) from Pulo Pandan distant 5 miles. Some rocks extend a quarter of a mile from the north end of Pulo Salanama, and off the south-east end there is a small islet having a remarkable single tree on it.

**Assarhan river** (lat.  $3^{\circ} 1' N.$ , long.  $99^{\circ} 51' E.$ ), 22 miles to the south-east of Batoo Barra, has a mud flat extending from its entrance 8 miles to the north-east, the soundings upon which decrease regularly towards the

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\* Captain Quin, R.N., H.M.S. *Raleigh*, states that the people from Batoo Barra, who with their families resort to this island, remain some three months in each year to catch turtle and preserve its eggs; and that they also prepare dry fish-roe and fish for the markets of Penang, Malacca, and Singapore.—*Horsburgh's Directory*, vol. 2.

shore. This flat is a continuation of the flat already mentioned as extending a considerable distance along the shore N.W. and S.E. of Batoo Barra river.\*

Between Assarkan and Reccan rivers care is required not to approach too near the coast, as the mud flats extend a considerable distance off shore, and the lead gives little warning. At the mouth of Lidang bay, 20 miles to the south-east of Assarkan river, the flat extends 11 miles from the bottom of the bay.

**RECCAN, or RAKAN, RIVER** has at its entrance two low wooded islands, Pulo Lalang Besaar, in lat.  $2^{\circ} 12' N.$ , long.  $100^{\circ} 35' E.$ , and Pulo Lalang Kechel. The former is the larger of the two islands, and bears N. by W.  $\frac{1}{2}$  W. from the smaller one  $2\frac{1}{4}$  miles distant. There is a passage of 9 to 12 feet water between them leading into the river.

Reccan river is about 15 miles broad at its mouth, decreasing in breadth, 8 or 9 miles up, to 4 miles, and continuing afterwards a breadth of 2 miles to the junction of its two tributaries, Bangka and Tana Putie. On the left bank of the river, a few miles up, is a scattered village named Bangka, the inhabitants of which are not to be trusted.

**Tides.**—It is high water, full and change, in the entrance of the river at 6h. The river has a rise and fall of 26 feet, and is almost dry at low-water springs. The tides run at the rate of  $5\frac{1}{2}$  miles an hour, and produce a bore at springs. The velocity of the stream is much greater a few miles farther up the river.

From the islands at the entrance the river extends in a S.E. by S. direction 31 miles, when it takes a more easterly direction, and is called Tana Putie river. At this part of the river also is situated the town Tana Putie. The river, which is  $1\frac{1}{2}$  miles wide here, is said to take its rise from the mountains, and is shoal and from the rapidity of the tides dangerous. Several large and populous villages subject to the Rajah of Siak are said to exist on its banks.

The eastern bank of Reccan river projects to the north-west, forming the headland called Oujong Perbabeau, from which a mud flat extends to the N.W. and N.N.W. about 10 miles; upon this flat the soundings decrease regularly.

**Caution.**—When clear to the eastward of this bank the vessel enters upon the most dangerous part of this coast, its various sandbanks extending over to South sands, with gaps and narrow channels of mud soundings between them. As the soundings afford no guide in approaching these banks, the depths suddenly decreasing upon them, it is necessary for a vessel intending

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\* At its mouth Assarkan river is 1,600 yards wide, but 7 miles farther up, where it receives a tributary called the Silau (dazzling), it narrows to one-third of this breadth. Fronting its embouchure there is an extensive mud-flat, and at low water spring tides the depth in the channel of the river itself does not exceed 12 feet.—Crawford's *Descriptive Dictionary of the Indian Islands and adjacent Countries*. London, 1856.

to pass between the banks to have a boat ahead sounding, and to keep a good look out from aloft, for the shoal banks can be plainly seen in daytime when the sky is clear.

Between Oujong Perbabean and Oujong Bantan, the north point of Pulo Rupert, the coast forms a deep bight, which is fronted by an extensive sand-bank; this bank, together with those just mentioned, renders this part of the Sumatra side of the strait very intricate and dangerous.

**PULO RUPAT.**—The north point of this island is called Oujong Bantan, and is in lat.  $2^{\circ} 8' N.$ , long.  $101^{\circ} 39' E.$  It is bold to approach, there being 30 fathoms water within  $1\frac{1}{2}$  miles of the shore. Separating Pulo Rupert from the mainland is Salat Rupert, said to be a safe channel for proas. The eastern side of Pulo Rupert is bold until near the entrance of Brewer's strait, where a mud-bank extends from the shore of Pulo Rupert about 5 or 6 miles.

**BREWERS STRAIT or SALAT PANJANG.**—The north part of this strait is formed between the mainland of Sumatra and Pulo Bucalisse, and has a general S.W. direction for 20 miles with a breadth of about 5 miles. A shoal mud-bank extends 8 miles to the northward from Tanjong Jati the west point of Pulo Bucalisse. The soundings in the strait vary from 8 to 20 fathoms with the following exceptions: A bank skirts the western shore from Tanjong Muranbung to Bukit Bato, and 7 miles beyond extending in some places a mile off shore. Eastward of Tanjong Muranbung commences a narrow ridge of 7 to 15 feet which extends to the south-east  $6\frac{1}{2}$  miles. Between this ridge and the shore bank there is a channel 7 to  $1\frac{1}{2}$  fathoms water one or 2 miles wide. There is a shoal of 10 feet situated 6 miles to the north-west of Bukit Bato, and  $1\frac{1}{4}$  miles off shore. Heads of  $4\frac{1}{4}$  fathoms are situated 2 miles to the S.W. and South of Tanjong Jati.

On the west side of Brewer's strait, about 8 miles from the entrance, is the town of Bukit Bato situated upon the banks of a very narrow river of the same name; the town is not easily perceived, the houses being scattered among and hidden by the trees, but it may be known by a tree, formed like an umbrella, near the entrance of the river.\*

**Salat Padang.**—At Tanjong Ballai, 11 miles to the south-east of Bukit Bato, the strait is 3 or 4 miles in breadth, and opposite to the point is the entrance to Salat Padang, formed between Pulo Bucalisse and Pulo Padang, and affording a safe passage for boats. Near the entrance of the channel there is a shoal ridge having one to 9 feet water.

From Tanjong Ballai, Brewers strait tends in a south direction 10 miles to the mouth of Siak river. Thence the strait extends S.S.E. to the

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\* Captain M. Quin, R.N., H.M.S. *Raleigh*, who visited Bukit Bato describes it as being built on piles, and as the principal station of the war proas of the Rajah of Siak. The *Raleigh* anchored abreast of the little river in  $12\frac{1}{4}$  fathoms, with the town of Bukit Bato bearing W.S.W. and Tanjong Jati bearing N. by W.  $\frac{1}{4}$  W.



western end of Pulo Rantow, where it contracts to  $1\frac{1}{2}$  miles in breadth, with regular soundings of 8 to 10 fathoms.

**Salat Ringit.**—Between Pulo Rantow and Pulo Padang there is a channel leading to the sea called Salat Ringit, and said to be used only by boats.

From the western end of Pulo Rantow, Brewers strait takes an easterly direction about 25 miles with soundings of 10 or 15 fathoms, till a small island in the middle of the strait is approached; on each side of this island there is a passage, taking care to keep close to either shore of the strait, as a mud flat extends to the westward from the island  $2\frac{1}{2}$  miles into the middle of the strait, and to the eastward about 2 miles into the middle of the strait. Thence the direction of the strait is to the south-east, and after passing three small islands on the port hand the southern entrance opens, off which there are a number of islands. The safest channel out appears to be between Pantow point and Pulo Senappoo, which channel has soundings of 6 feet at low water in some parts.

**Tides.**—The rise and fall of the tide at the southern entrance of Brewers strait is about 15 feet, with a velocity of  $3\frac{1}{2}$  miles an hour, but much greater when nearer the entrance of Campore river. The tides are greatly influenced by this river producing a strong eddy round some of the islands, so that while the tide is running to the southward on one side of an island, it may often be found running to the northward on the other.

**Campore river** (entrance in lat.  $0^{\circ} 33' N.$ , long.  $103^{\circ} 6' E.$ ) is fronted by an extensive mud flat almost dry at low water. It is little frequented on account of its rapid tides and bore.

**SIAK RIVER** falls into Brewers strait on the west side. Its entrance is three-quarters of a mile wide and has a sandy spit almost dry at low water, extending nearly across, but leaving a narrow channel close to Tanjong Lyang (the eastern point of entrance.) The town of Siak, consisting of wooden huts, is about 65 miles from the mouth of the river.\*

In July 1845 H.M.S. *Vixen*, Commander George Giffard, entered this river and proceeded to Siak. On crossing the bar the vessel (drawing 14 feet) shoaled the water to 15 feet, but, on proceeding up, deepened gradually to 12 and 15 fathoms off the town and 6 miles higher up. In entering the river, bring the eastern point of the entrance to bear S. by E. and steer for it on that bearing, keeping the east side of the river on board until above the second island, off which a shoal extends to the eastward; thence the river is clear to the town of Siak.† For vessels of about 200 tons the river Siak is said to be navigable for 20 miles beyond the town of Siak; including boat navigation its navigable course has been estimated at 150 miles.

**Tides.**—At the mouth of Siak river it is high water, full and change, at 9h.; tides rise 12 feet, and set at the rate of  $2\frac{1}{2}$  miles an hour. Off the

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\* See sketch of entrance of Siak river on Admiralty chart No. 1,355.  
Commander George Giffard, R.N., H.M.S. *Vixen*, 1845.

town of Siak the tide rises 11 feet. It has been stated that the night tides are always higher than the day tides.

**CAUTION.**—The eastern sides of Pulo Bucalisse, Pulo Padang, Pulo Panjang, Pulo Rantow, and the western sides of Pulo Pappan, or Sabon, should be approached with great caution, as they are fronted by extensive mud-banks, and dangerous sand-banks, in some places having only 9 feet water on them.

**STRAITS of SABON and MANDOL** are very intricate, and are never used by European navigators. The former is contiguous to the western side of False Durian, Sabon, and Great Carimon islands; that of Mandol is along the Sumatra coast, having part of the coast, the islands of Mandol and Pantjoor, and the entrance of Brewers strait on the western sides, and several islets and reefs on the eastern side which separate it from Sabon strait.

**GREAT CARIMON ISLAND** is 11 miles long in a N.N.W. and S.S.E. direction; near its north end are two peaked hills, the northern one 1,376 feet high, and the southern 1,474 feet; the rest of the island is low barren land. Its southern end is separated from Sabon island by Glam strait,  $2\frac{1}{2}$  miles wide. Near the west side of Great Carimon island are several low islands of various sizes, and its east side is fronted by a shoal mud-bank, but the north-east point has 6 to 8 fathoms water very near it.

**LITTLE CARIMON** separated from the north-east end of Great Carimon island by a channel half-a-mile wide, is a high bold island  $2\frac{1}{2}$  miles long, N.W. and S.E., and rising in two peaks covered with trees, the northern being 1,067 feet high, and the southern 1,026 feet high. A small islet is situate in the south entrance of the channel between Great and Little Carimon islands.

There is good anchorage to the south-east of Little Carimon island during the south-west monsoon.

The **BROTHERS** are round islets, the two outermost of which lie near each other about  $2\frac{1}{2}$  miles north-westward of Little Carimon, the other of similar appearance is within a mile of that island, and is not so soon discerned as the outer ones. About 2 miles to the southward of the Brothers, and a mile from the nearest part of Great Carimon, is White rock, above water. Seal rock, surrounded by foul ground, is situated about  $2\frac{1}{2}$  miles W.  $\frac{1}{2}$  N. from White rock.

Two and a half miles westward of Great Carimon are several small islands, Oxscar, the outer one of which, is situated nearly a mile off shore. The ground is foul within a mile of the western side of the northern island. The space southward of the islands, as also the west side of Great Carimon, is but little known.

Sailing directions for the channels eastward of Great Carimon will be found in China Sea Directory, Vol. I., chaps. 8 and 9.

## CHAPTER III.

## THE MALAY COAST.

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 VARIATION in 1876,  $1^{\circ} 40'$  E.
 

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**SALANGA or JUNKSEYLON ISLAND**, occupied by the Siamese of Ligor, is separated from the Malay peninsula by Papra strait, and extends between lat.  $8^{\circ} 9'$  N. and  $7^{\circ} 46'$  N., being about 22 miles long and 9 miles broad. A high regular sloping mountain is situated on the southern part of the island, and may be seen at a distance of 35 miles. The western side of Salanga extends nearly north and south; on the east side there are several bays, the chief one, where the harbour is situated, is about 12 miles from the south-east point of the island, and into which falls the small river upon which Terrua stands. Terrua (a landing-place) is about  $1\frac{1}{2}$  miles up the river.

The passage into the bay is on the north side of the two Lalan islands, which lie off the entrance in lat.  $7^{\circ} 56'$  N. between Little Lalan and an extensive reef, dry at low water, 2 miles north of it. There is another passage, with 5 fathoms water, into the harbour, between Great or South Lalan, and a small islet called the Cap and Feather, off the eastern point of Pulo Coco. The anchorage is to the north-west of the islands, in 4 or  $4\frac{1}{2}$  fathoms, mud, with Little Lalan (northernmost island), bearing E. by S., distant one mile; the mouth of the river West or W.  $\frac{1}{4}$  N. 3 or 4 miles.\*

**Tides.**—It is high water, full and change, at Salanga at 10h.; tides rise 11 or 12 feet. Between Junkseylon and the adjacent island, Pulo Panjang, the flood sets to the northward at the rate of 2 miles an hour; the ebb sets to the southward at the same rate.

**Supplies.**—Water, poultry, and various other articles of refreshment, may be procured in abundance, and formerly a considerable quantity of tin was exported.

Exclusive of Terrua bay other harbours are formed on the east side of Salanga island, particularly among Nacasava islands, about 5 miles northward of Terrua bay; also in the eastern entrance of Papra strait.

**PAPRA STRAIT** has from 12 to 21 feet water, and being barred by rocks at its western entrance prevents it being frequented by trading vessels.

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\* See Admiralty Chart : Papra strait, No. 842; scale  $m = 0.8$  inches.  
37363.

**Callat Leherel or Throat Strait** is formed between Pulo Panjang and the coast, and has only 2 feet in its shoalest part.

**Pulo Rajah or Pulo Taya** lies on the meridian of the high mountain in Salanga island, already mentioned, in lat.  $7^{\circ} 36' N$ .

**The BROTHERS** lie 5 miles south of Pulo Rajah, they are two in number, small, but moderately high, with an islet near them. Between these islands and others contiguous to the south end of Salanga the channel is safe, and has from 20 to 35 fathoms; it may be adopted by vessels approaching from the westward, but the main channel for those bound into Terrua bay is on the east side of Pulo Rajah and the Brothers.

**Pulo Panjang or Long Island**, called Ka Yau by the Siamese. The south end of this island and the islands interspersed between it and the south end of Salanga island are safe to approach, with soundings of 10 or 15 fathoms amongst them; the soundings decrease towards the shores on either side of the entrance to the gulf.

**FROM SALANGA or JUNKSEYLOM ISLAND to PENANG.**—The coast from Salanga island to Penang is fronted by many islands; inside most of the groups and between them there are passages for small vessels, but large vessels generally sail outside. During the north-east monsoon small vessels may pass on either side of the outer groups to the south-east of Pulo Pajang, as most convenient; the first of these, called the Vogels, is a group of small islands about 18 miles from Pajang, with 14 and 16 fathoms water inside and 25 to 30 fathoms outside of them.

**Pilgrims Island.**—The next group is the Pilgrims, about 12 miles to the south-east, and composed of small islands, and bearing nearly East about 27 miles from the Brothers off Salanga. The largest island of this group is sometimes called Slipper, or Sapata; but Slipper island seems to belong to a group of two or three islands 12 or 15 miles to the south-east.\* Between these islands and many others which lie adjacent to the coast, the depths are from 12 to 20 fathoms, and there is good anchorage amongst them. Supplies may be obtained at Pulo Telibon, which lies close to the shore in lat.  $7^{\circ} 14' N$ ., and where vessels may anchor in 4 or 5 fathoms in a small harbour on the western side; care is required in entering the harbour.

From Telibon a chain of high rocky islands extends along the coast to the north end of Pulo Trotto; there is a good passage of 8 to 10 fathoms water on the outside. A small vessel bound to Queda may pass inside the large islands of Trotto, Lancava, and Ladda, between the islands and the mainland; soundings of 4 or 5 fathoms will be found near the coast,

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\* The latter group is called Pulo Allang by the Malays, but navigators give to the largest the names of Pulo Mohea, Tupia, or Slipper island.

and 8 to 10 fathoms nearest the island ; the shore of the mainland is skirted by a shoal mud-bank, which extends a considerable distance towards the islands. Thence she may steer in 5 or 6 fathoms near the coast to Queda river.

Between Telibon and Pappan there are some dangerous rocks, covered at high water.

**Little Passage** is preferable to the last-mentioned one, inside the principal island. After rounding the Brothers at 3 or 4 miles distant, steer East and E. by S. for Pulo Mohea, which course will lead outside the Pilgrims, and about 8 or 9 miles to the eastward of Sangald rocks, but care must be taken to guard against the current.

**QUEDA RIVER.**—The entrance of this river is in lat.  $6^{\circ} 6' N.$ , and at low water has a depth of 3 feet on its bar ; there are fishing stakes on either side of the entrance, and a remarkable clump of trees is situated on the right bank. Vessels drawing 8 feet, and having a pilot, can proceed up the river to the town of Queda, which is 7 miles from the sea ; but it is necessary to moor head and stern there. Inside the bar the depths vary from 2 to 5 fathoms.\* Provisions may be obtained at Queda.†

There is anchorage in 5 or 6 fathoms 3 miles off the mouth of Queda river, with the entrance bearing E. by N. and Booting island S.S.E., thence the soundings shoal gradually to the sea.

**Tides.**—It is high water, full and change, at 12h. ; rise 9 feet.\*

**Elephant Mountain**, 780 feet high, is situated near the shore in lat.  $6^{\circ} 11' N.$ , and is an isolated and remarkable object. It is well named, as it has the appearance of an elephant kneeling, with its head to the southward. There is also a hill to the northward of the Elephant, but not so high, nor has it any remarkable appearance.

**Rivers.**—There are several rivers between Salanga island and Queda river. Phoonga, to the S.S.E. of Salanga, is a river of some importance, where the Siamese build their proas and boats ; the town is a considerable distance up the river. Trang river, inside of Telibon, is also navigable by proas or small vessels. Parlis river entrance is 18 miles to the northward of Queda river ; coasting vessels anchor off there in 3 fathoms to the south-west of a group of four islands named Pulo Panjang, Pulo Kuniyet, Pulo Korap, Pulo Brasmana, which lie near the main on a mud-flat, and with a haystack-shaped mount bearing N.N.E. ; the mud-bank lining the coast here is very flat.

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\* Commander J. F. G. Grant, H.M.S. *Midge*, 1873.

† The province of Queda is bounded on the north by the Siamese territory of Ligor, to the east by the Malay state of Patani, and to the south by the state of Perak. The island of Penang formerly belonged to the state of Queda.—Crawford's *Descriptive Dictionary of the Indian Islands and adjacent Countries*. London, 1856.

**SANGALD or GUILDER ROCKS**, in lat.  $7^{\circ} 10' N.$ , 15 miles south of the Pilgrims, and the same distance W. by  $S \frac{1}{2} S.$  from Pulo Mohea, is a reef elevated 2 or 3 feet above water; it is steep, having 30 to 40 fathoms close to. These rocks are said to be visible only during the north-east or dry monsoon, consequently great care is required in approaching them.

**DIRECTIONS.**—Having approached Pulo Mohea, pass it on the west side at 4 or 5 miles distant, by which a berth of 9 miles will be given to Sangald rocks, lying to the westward. From Pulo Mohea steer about S.E. by E. for Edam, which is the easternmost of three small islands of moderate height, situated nearly midway between Pulo Buton and Trotto. In passing between Trotto and Edam islands keep closer to the latter to avoid Black rock, which is awash at low water, and lies 4 or 5 miles off the north-west side of Trotto. There is also a dangerous reef on which the sea breaks fronting the south-east end of Buton island; there is a passage having 16 fathoms water between the reef and Edam islands, which passage may be used if necessary. From Edam steer south-easterly for the south-west end of Pulo Laddas, which, if the wind be northerly or north-easterly, pass in 16 fathoms; then steer E.S.E. for Boonting islands.

**LANCAVA ISLANDS**, consisting of a group of three large islands and many smaller ones, extend north-west and south-east, and are high, bold islands, particularly Lancava, the central one, which has a peaked hill (Gumong Raya) 2,952 feet in elevation. There is also to the south-east a peaked hill resembling the former, which is generally called Ladda peak. Within 2 miles of these islands there are irregular soundings of 8 to 16 fathoms water. At a distance of 10 or 12 miles westward of the islands the depths are 24 to 30 fathoms. The shore of the mainland adjacent is fronted by a mud-bank, which extends from 5 to 10 miles off the coast.\*

**Currents.**—In the offing the currents generally set to the northward during the south-west monsoon, and to the southward during the north-east monsoon.

**Tides.**—Amongst the islands and in the channel between the islands and the shore a tidal influence prevails. It is high water, full and change, at 12h.; rise 12 feet.

**Trotto**, the northernmost large island of the group, has a cove or small harbour at its north-east end; the channel which separates this island from Lancava has 8 to 14 fathoms. Near the south-east point of Trotto there is situated an islet and a small rock. A high pyramidal rock, having 15 fathoms close-to, lies at about one third the distance from the south-east point of Trotto to Lancava.

**Pulo Buton** is formed of two large and high islands very near each other, with some islets adjacent and a reef of rocks off their south-east extremity.

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\* See Admiralty chart, Sumatra, West Coast, sheet 1, No. 2760.

The eastern of the two large islands is formed of a regular sloping pyramidal mountain called Buton Dome (lat.  $6^{\circ} 33' N.$ ), which may be seen from a distance of 50 miles. The soundings close to Pulo Buton are 17 to 26 fathoms.

**Laddas Islands**, which form the south and east parts of the group, are high, rugged islands of barren aspect.

**BASS HARBOUR.**—Between the two largest Laddas islands, at their southern extremity, Bass harbour is formed.\* The channel leading to it from the north-west is along the south-west end of Lancava island, where the depths are from 7 to 12 fathoms, and there are from 4 to 10 fathoms water in the channel leading into the harbour from the southward. The south part of Lancava island, about 3 or 4 miles to the northward of Bass harbour, is partly cleared and inhabited by Malays and Chinese, but there being no trade at these islands the harbour is not frequented.

**Caution.**—Strangers landing on any of the Lancava islands ought to be cautious if they penetrate inland, for the snakes here are very large. These islands are also a rendezvous for pirates, who are on the look out to attack trading proas or small trading vessels. They have sometimes been known to lurk about the entrance of Penang harbour.

**Pulo Seguntung**, a high rock, lies S.E. 10 miles from the south extreme of Pulo Tubah, and is in lat.  $6^{\circ} 3' N.$ , long.  $99^{\circ} 54' E.$  There are 17 and 18 fathoms close to its north and east sides, and 19 fathoms 2 miles to the south-west of it.

**Pulo Payer**, lying 6 miles E.  $\frac{3}{4}$  N. from Pulo Seguntung, is high, about a mile long N.E. and S.W., and 3 cables broad: it is steep-to, with the exception of part of the north-east side. A mile S.W. of the south-west point of the island there is a 5-fathoms patch. A mile from the north-west side of the island there is another patch of 5 fathoms.

**Pulo Lambu**, separated from the north-east end of Pulo Payer by a channel half a mile wide, is about a quarter of a mile in extent, high, and foul on its north side to the extent of 2 cables. In the channel, and about a quarter of a mile from the west end of Pulo Lambu, is Pulo Katcha, a small rock about 3 feet high. The entrance of Queda river bears E. by N. distant 14 miles from Pulo Lambu.

Near the islands of Pulo Payer and Pulo Lambu there are, with the exceptions mentioned, soundings of 13 to 16 fathoms within half a mile of the islands. Soundings of 10 to 14 fathoms will be found until within 5 miles of the entrance of Queda river.

**PULO PERA**, or Silver island (lat.  $5^{\circ} 42' N.$ ,  $98^{\circ} 56' E.$ ), is a peaked, barren, white rock, 394 feet high, entirely devoid of trees, and the resort of

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\* See Admiralty chart, No. 793*a*, with continuation of the coast to Bass harbour.

numerous sea birds; \* it lies nearly midway between Diamond point and Queda river (Malay coast). Pulo Pera is often taken as a point of departure, and when the weather is cloudy during the south-west monsoon it is not unfrequently the first land seen after entering Malacca strait. The island is steep-to, there being 40 or 50 fathoms water very near it, 40 to 60 fathoms within a distance of 5 or 6 miles, and no bottom at 60 or 70 fathoms 18 or 20 miles to the westward. Sailing vessels should give it a wide berth during the south-west monsoon, for at that time calms and light airs are likely to prevail in its neighbourhood, during which vessels have been carried by the current towards it, and were obliged to anchor in deep water to prevent being driven against the steep rock.

**BUNTING ISLANDS** consist of Pulo Bunting (lat.  $5^{\circ} 53' N.$ , long.  $100^{\circ} 19' E.$ ), Pulo Songson, Pulo Tolo, and Pulo Beedam; the whole of these islands are barren. A depth of 12 fathoms will be found 3 miles seaward of them. Pulo Bunting is 610 feet high,  $1\frac{1}{4}$  miles long in an E.N.E. and W.S.W. direction, half a mile wide at its broadest part, and separated from the mainland by a channel a mile wide, and which has 6 to 9 feet water. A rock awash is situated  $2\frac{1}{2}$  miles to the northward of Pulo Bunting, and  $1\frac{1}{2}$  miles from the shore.

**Pulo Songson**, lying 4 miles S. by W.  $\frac{3}{4}$  W. from Pulo Bunting, and  $4\frac{1}{4}$  miles from the mainland, is almost circular, about a quarter of a mile in diameter. Between Pulo Songson and Pulo Bunting the soundings are from 4 to 7 fathoms. There is deep water on the eastern side of the island,† but the remaining sides are skirted by a reef which extends a cable to seaward. A mile S.W.  $\frac{1}{2}$  W. from Pulo Songson are Songson rocks, 25 feet high, and occupying a circular space of a quarter of a mile in diameter. There are from 8 to 10 fathoms close to the rocks.

**Pulo Tolo** lies S. by W.  $2\frac{1}{4}$  miles distant from Pulo Songson, and is skirted by a reef. Regular soundings of  $7\frac{1}{4}$  fathoms are found between the two islands, and the water shoals gradually towards the shore from 6 fathoms near Pulo Tolo to 3 fathoms, the latter depth being found at  $1\frac{1}{2}$  miles from the shore.

**Pulo Beedam** lies a mile south of Pulo Tolo, and is two-thirds of a mile long in a N.N.W. and S.S.E. direction by a quarter of a mile broad. The island is almost encircled by a reef, and has from 4 to 6 fathoms within half a mile of its shores.

**The COAST** from Queda river extends in a S. by E. direction 25 miles to the entrance of Marbu river; from Queda the coast continues low and woody till within 8 or 9 miles of Marbu river, where Gunong Jurrai or Queda peak is situated at a distance of 4 miles from the coast. In

\* Navigating Lieutenant F. J. Gray, R.N., H.M.S. *Nassau*, 1872.

† Between Bunting and Songson islands there is a small rocky islet.—Navigating Sub-Lieutenant G. F. Whitmore, H.M.S. *Midge*, 1873.



lat.  $5^{\circ} 56' \frac{1}{2}$  N. and 7 miles from the coast is situated Bukib Choreh or False Elephant hill; the head of the animal it represents is situated to the westward and the hump to the eastward. Southward of Marbu river, as far as the north entrance to Penang, the coast continues low.

A mud-flat skirts the shore between Queda and Marbu rivers, on which flat will be found a depth of 18 feet at one to 2 miles from the shore, except abreast of Pulo Beedam and Marbu river, where the edge of the bank is  $4\frac{1}{2}$  miles from the shore. The edge of the bank then gradually approaches the shore till abreast the north end of Pulo Penang, where it is a mile distant from the shore.

**Marbu River.**—The entrance of this river, formed between the low coast on the north and Marbu hills on the south, is almost closed by a mud-flat which has 4 to 6 feet water, and extends nearly 3 miles to seaward. Off the south side of the entrance is situated the small island of Pulo Sayer.

The coast thence, as far as the locality of Penang, is low and skirted by a bank which extends 3 miles to seaward, and has from 12 to 18 feet water. In this tract of coast several small rivers, of which Muda is the chief, discharge into the sea.

**Caution.**—In passing between Queda river and Penang during the night care must be taken to keep clear of the numerous fishing stakes which are moored some 6 or 7 miles from the land.\*

**PULO PENANG**, or Prince of Wales island, a British settlement lying between the parallels of  $5^{\circ} 28'$  N. and  $5^{\circ} 15'$  N., is nearly 14 miles long in a north and south direction, by 8 miles broad, and has an area of 164 square miles; it is separated from the mainland by a strait  $1\frac{1}{2}$  to 7 miles broad.† On the opposite shore of the mainland Province Wellesley, a strip of territory about 35 miles long, and averaging 8 miles in width, also forms part of the settlement; this territory is situated south of Muda river.

The north part of the island is mountainous, and through the centre of the island runs a range of hills, declining in height as it approaches the south-west extremity, but two-thirds of the whole surface of Penang are level and of gentle inclination, and, like the hills, are covered with woods. West hill, the highest point of the island, is 2,735 feet high; at a short distance to the eastward is Government hill, on which stands a signal flagstaff 2,550 feet above the sea. The western side of the island is low and wooded. The climate of the high lands is said to resemble that of Funchal in Madeira; the thermometer in the plains ranges between  $76^{\circ}$  and  $90^{\circ}$ , and on the mountains  $64^{\circ}$  to  $76^{\circ}$ . Rain falls throughout the year. Excepting in a few places, Penang is considered to be very healthy. The island produces much timber, which is well adapted for shipbuilding and masts; also

\* Commander A. T. Powlett, H.M.S. *Avon*, 1874.

† See Admiralty Chart: Penang, or Prince of Wales island, No. 1,366; scale  $m=1$  inch.

fine fruits. The soil is favorable to the growth of spices ; the chief cultivation is in sugar, rice, and cocoa-nuts. Tin ore is found at the base of the mountains.

**Georgetown**, the capital, is situated at the north-east extremity of Penang, and has a population of 13,000. It is built on level ground, consists of a long and broad street, intersected by other smaller ones, is clean and well supplied with water. It has a handsome church, an Armenian chapel, two Roman Catholic chapels, a court house, gaol, public school, poorhouse, the government offices, and the civil and military hospitals. A few shops are kept by Europeans, but the greater number by Chinese.

Fort Cornwallis is built on the north-east point of the island, close to the town. There are cantonments for troops near the town.

In 1871 the population of Penang was 71,000, who are almost entirely engaged in agriculture. Of this number the Malay race predominates, the Chinese rank next, and constitute about one-fourth of the whole population, the remainder being composed of Europeans and their descendants, natives of the Coromandel coast (called Chuliahs and Klings), Burmese, Siamese, and Bengalees.

**Telegraph.**—Penang has telegraphic communication by sub-marine cable with Madras and with Singapore.

**Exports.**—The exports comprise tin, sugar, spices, sago, rice, buffalo hides and horns, rattans, gum, coffee, and opium. In 1873 the united value of the exports and imports was 6,761,000*l*.

Penang is situated upon a shoal bank which on the north side extends in a circular form from Georgetown to Tanjong Puchut Muka (the north-west point), a distance of  $2\frac{1}{2}$  miles from the coast ; at this distance a depth of 18 feet will be found. On the west side the same depth of 18 feet will be found at a distance of 3 miles ; the edge of the shoal bank gradually approaches the south-west point of the island, at which place it is only a quarter of a mile distant. On the south side of the island the edge of the bank is found at a distance of  $3\frac{1}{2}$  miles. An extensive series of shoal banks skirts the eastern side of the island, leaving a narrow channel between them and Great Kra flat.

Two miles to the south of the south-west point of Penang is Pulo Kandy or Saddle island, high, about half a mile long and a quarter of a mile broad. Separated from the south-east point of Penang by a shoal passage of 4 cables in width is Remo island, which is steep-to on its south-east side. From Remo island a shoal bank extends in a circular form to Tanjong Garetah Sangool, the south-west point of Penang.

**Pulo Jerajah**, 734 feet high, lying 5 miles S. by W. from Georgetown, is a bold island rising in a pyramidal form ; between the island and the shore of Penang there is a channel having from 18 to 30 feet water. The

east side of Pulo Jerajah is comparatively steep, a depth of 5 fathoms being found at a distance of 2 cables from the shore, except near the north-east part.

Between the south end of Pulo Jerajah and Batumou point, Penang, is Batumou flat,  $1\frac{1}{2}$  miles long, three-quarters of a mile broad, and having one to 3 feet water.

**Middle bank** joins the north end of Pulo Jerajah, and extends in a N. by E.  $\frac{1}{2}$  E. direction 4 miles, where it joins the bank which fringes the eastern side of Penang. Between Middle bank and the bank which borders the shore of Penang there are from 4 to 5 fathoms water. The greatest breadth of Middle bank is  $1\frac{1}{2}$  miles, diminishing to half a mile at its northern end; a large extent of its western side is dry. Near the centre of the eastern side is Syrang sand, a narrow ridge three-quarters of a mile long, having 7 to 9 feet water close to its eastern side. The eastern side of Middle bank is marked by three red buoys.

**CHANNELS.**—The approach to the anchorage off Georgetown is by two channels, north and south. North channel is at all times preferable for large ships, as the water is deeper; south channel is dangerous for a large vessel to proceed through without a pilot.

**North Channel** is formed between the mud-flats which skirt the shore of the mainland and of Penang, and has 25 feet water in its shoalest part, the channel of deep water lying midway between the two shores. The shores of the mainland, being low and covered with trees, are not so conspicuous as the high land of the island; consequently the latter will generally appear nearer when the vessel is mid-channel between them. Tekoos a small islet lies 4 miles to the north-west of Fort point and half a mile from the shore; a white obelisk is situated on the islet. Rocks extend a cable north-east of the islet and there are other rocks south-west of it. Abreast of Tekoos the water in the fairway deepens gradually to 8 or 9 fathoms in the harbour of Georgetown. In the bay northward of Georgetown there is a depth of 18 feet at  $1\frac{1}{4}$  miles from the shore.

The fishing stakes which are situated  $4\frac{1}{2}$  miles N.W. by N. from Tekoos islet and  $3\frac{1}{2}$  miles from the nearest part of the shore are a guide to the deep-water channel; they are moored in 5 fathoms water, but a good berth should be given to them as there are many old stakes broken off two or three feet under water. The outer fishing stakes are marked by a ball beacon on the outer extremity. Pass a mile to the northward of these stakes and steer for the white obelisk which is situated on the mainland north-eastward of Georgetown on a S.E.  $\frac{1}{4}$  S. bearing. When Cornwallis fort bears S. by E.  $\frac{1}{2}$  E. alter course for the anchorage. Large vessels should not attempt to enter at night as there are no leading lights, and they are liable to run foul of the fishing stakes, some of which are in the fairway.

In tacking, the lead is a sufficient guide.

**Anchorage.**—The anchorage off Georgetown is situated in the narrowest part of the strait which is here  $1\frac{1}{2}$  miles broad ; it is well sheltered and capable of accommodating a large number of vessels. There is deep water close to Fort point, and the water shoals gradually at half a mile from the mainland towards the shore ; the best berth for a large vessel is about a quarter of a mile southward of the Fort point in 10 or 11 fathoms, and for small vessels closer to the town. It is necessary to moor as the tides run very strong.

**Tides.**—It is high water full and change at Georgetown at 12 hours ; springs rise 9 feet, neaps  $7\frac{1}{2}$  feet. At springs the tides run at the rate of 3 miles an hour, and the streams turn two hours after high and low water.

**South Channel.**—The south channel to Georgetown is formed between the bordering shoals of the south side of Penang, Jerajah island, Syrang sand and Middlebank on the west side, and Great Kra Flat on the east side. The deep-water channel varies in width from 2 cables to a mile, and has 19 feet least water ; it is marked by white buoys on the eastern side and by red buoys on the western side ; these buoys are numbered alternately east and west, commencing with No. 1 at the north and west side of the channel, with this exception that Nos. 7 and 8 are both on the east side of the channel. Fishing stakes also extend a considerable distance into the fairway.

From the southward a vessel should not bring Pulo Kandy to bear westward of N. by W. until the east extreme of Remo island bears N.E.  $\frac{1}{2}$  N. ; the course may then be altered for Remo Island, passing 2 cables to the north-west of No. 10 (a white) buoy and between the latter and No. 9 (red) buoy ; thence the vessel will be guided by the chart and by the eye to the anchorage off Georgetown.

Sailing vessels should not enter the south channel without a commanding breeze from the south or south-west, which breeze does not often blow except in the commencement of the rainy season, August and September.

**PILOTS** are stationed at Pulo Jerajah and will board vessels on the proper signals being made.

The best time to leave the harbour of Penang during the north-east monsoon is just before sunset.

**GREAT KRA FLAT.**—This flat extends along shore from abreast Pry river to Pulo Tallong, a distance of 60 miles in a S. by E. direction, and has a breadth of 10 to 12 miles. The northern end of the flat is situated 2 miles S.S.E. from Fort point, Georgetown, and three-quarters of a mile to the westward of the entrance of Pry river, it thence continues in the shape of a tongue as far as Kra islands, where it joins the coast and then continues as a bordering bank to its southern limit ; between the east side of this tongue and the shore there is a channel of 3 to 7 fathoms depth. On

the outer edge of the flat there is a depth of 3 fathoms shoaling towards the shore. In some parts the flat is dry at low water. Outside Kra flat the water deepens to 10 fathoms at a distance of one to 5 miles from its edge.

**Tides.**—The tidal streams from the rivers which discharge upon Great Kra flat set strongly across the flat; caution is therefore required on the flood.\*

In the offing between Penang and Parcelar hill the tides during springs are regular, the flood setting to the south-east, the ebb north-west, at the rate of  $2\frac{1}{2}$  or 3 miles an hour. During neaps there is no perceptible tide.

**Rivers.**—The rivers Pry, Joru, Junjong, Tenga, and Kreean have their exit on the coast abreast Penang.

**Kra Islands** lie off the entrance of Junjong river, about a mile distant. North Kra island is a mile long in a north and south direction; South Kra is three-quarters of a mile long in a north-east and south-west direction, and separated from North Kra by a passage having 4 feet water. Eastward of Kra islands the depths are from 6 to 12 feet as far as the bank, which extends to the north-west from the south side of the entrance to Junjong river. There is a channel of not less than 4 fathoms leading from Georgetown to Kra islands.

**The COAST** from Penang to False Dinding has a general S.S.E. direction forms several bights, and is low and thickly wooded; throughout this extent the coast is bordered by Great Kra flat already mentioned. On this tract of coast many rivers discharge themselves.†

**LARUT RIVER.**—The entrance of this river in lat.  $4^{\circ} 43' N.$ , long.  $100^{\circ} 33' E.$ , may be known by a gap in the mountains situated over the entrance; the gap shows as a hummock and may be easily recognized when the vessel is nearing the land; from the north it opens out on the bearing E.  $\frac{1}{4}$  S., and from the southward on the bearing E. by N.  $\frac{3}{4}$  N.

H.M.S. *Midge* in June 1873 anchored off the entrance of the river, 7 miles distant, in 17 feet, with the following bearings, namely, South mound, N.E.  $\frac{1}{2}$  E.; North mound, N. by E.; Pulo Kandy, N.N.W.  $\frac{3}{4}$  W. A small steam vessel by which the *Midge* was accompanied proceeded from the anchorage mentioned for the river; she steered E. by S. for the high peak of the mountains on the south side of the river, and remained upon

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\* Navigating Sub-Lieutenant G. F. Whitmore, H.M.S. *Midge*, 1873.

† Selensing river, the entrance of which is 9 miles to the northward of Larut river, is said to have a depth of 3 feet on its bar at low water. It is also said that vessels drawing 8 feet may pass through Selensing river into Larut river.

that course until shoaling the water to 15 feet, then altered course to East, when the soundings were 11 feet at a distance (by masthead angles) of 2 miles from the *Midge*; this was the commencement of the bar, and the water continued to shoal to 8 feet at high-water neaps; that was the shortest cast obtained, and was  $4\frac{7}{10}$  miles from the *Midge*. Inside the bar the water deepened quickly to 18 and 21 feet. Proceeding up the river the north bank was kept onboard until a small river, the Sapatang, opened on that side, then steered across to a similar opening on the south bank, off which the vessel anchored. The river apparently continued in an E. by S. direction for some distance, and then turning to the northward.

In August following H.M.S. *Midge*, drawing  $8\frac{1}{2}$  feet, twice crossed the bar of Larut river.\*

Larut river "should not be approached without a pilot, the only guides

## DIRECTIONS FOR MALACCA STRAIT.

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**DINDING CHANNEL.**—According to an examination of Dinding channel made by the officers of H.M.S. *Fly*, in October 1875, the northern entrance of this channel is blocked for vessels drawing more than 10 feet water; this is said to be owing to shoal patches which extend from the south point of the N.E. bay across the channel in a N.  $\frac{1}{2}$  E. direction. Of these shoal patches the central one is Charybdis rock, which is said to be a quarter of a mile from the point. There is deep water between the patches, but the passage is not safe for vessels drawing more than 10 feet. Rocks also extend a third of a mile to the eastward from the north point of the north-east bay.

and S.E. by S. direction, 2 miles broad, and is separated from the main by a passage which is one to 2 miles wide. The island is thickly wooded with teak and mahogany, and has two peaks towards its north extreme, which with those of False Dinding offer good marks for obtaining a ship's position; the north point is in lat.  $4^{\circ} 15' 50''$  N., long.  $100^{\circ} 31'$  E.

\* Commander J. F. G. Grant, R.N., and Navigating Sub-Lieutenant G. F. Whitmore, H.M.S. *Midge*.

† Remark Book, H.M.S. *Hornet*, 1872.

On the east side of the island there is a stream of fresh water near the ruins of a Dutch fort ; there is an abundant supply of water all over the island.

The population of Pulo Dinding is about 300, consisting of Malays and Chinese, all of whom subsist by fishing.\*

**Dinding river.**—On the east side of the bank on which Wedge rock lies there is a channel having 21 feet least water, leading to the entrance of Dinding river, which is said to be navigable for vessels drawing 7 feet water. A mile to the southward of this river the bank joins the coast, which it skirts as far as Pulo Katta, and is dry in some places.

**Dinding Channel.**—Westward of the bank just mentioned, and between it and Pulo Dinding, there is, according to the survey of Commander C. Y. Ward, I.N., a channel, 3 to 4 cables wide, and of late navigated by vessels of war drawing 19 feet. Off the north end of Pulo Dinding there are several small islets, the northern of which is surmounted by a tuft of trees. The soundings are irregular about the northern part of the channel, apparently caused by boulders of rock ; and off the south point of the north-east bay of the island there are some sunken boulders, having 10 feet water, on which H.M.S. *Charybdis* struck in July 1874 ; they are situated at a half or three-quarters of a cable from the point mentioned. "These and all other dangers may be avoided in this channel by keeping the island shore about a cable distant, in this way nothing under  $4\frac{1}{2}$  fathoms will be met with."†

"On the east side of the south entrance to the channel there are fishing stakes on the bank ; by keeping midway between these and the shore deep water and regular soundings will be obtained."‡

There is good anchorage off the police station in Pulo Dinding in 10 fathoms. Fish may be caught by the sein.

The west side of Pulo Dinding is comparatively steep ; near the middle is a small island, and half a mile off the south-west extremity of Pulo Dinding is Little Dinding, an island  $1\frac{1}{4}$  miles long, by three-quarters of a mile broad. On the south side of Pulo Dinding there is deep water.

**Tides.**—It is high water, full and change, at Pulo Dinding at 3h. ; tides rise 8 or 9 feet, and in Dinding channel run 2 to 3 knots an hour.

**Pulo Katta** is a small islet lying  $2\frac{3}{4}$  miles S.E. of the south-east point of Pulo Dinding, it is separated from the mainland by a rocky passage, a cable wide.

The coast between False Dinding and Pulo Katta is rocky, with undulating hills close to the sea.

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\* A British station has recently been established at Pulo Dinding, and a strip of territory on the mainland adjacent to the island is in British occupation.

† Remarks by Commander A. T. Powlett, R.N., H.M.S. *Avon*, 1874.

‡ Navigating Sub-Lieutenant G. F. Whitmore, H.M.S. *Midge*, 1873.

**PERAH or PERAK (Silver) RIVER.**—Eastward of Pulo Katta the coast is low, covered with jungle, and forms a bight to the entrance of Perah river, which is 8 miles to the eastward of Sambalang islands, and is said to extend 150 miles inland. The bight is skirted by a bank which extends 2 to 5 miles from the coast, and blocks up the entrance of Perah river. In the middle and south side of the entrance the water is shoal, there being many places dry at low water. The river inside is wide and deep, and is said to be navigable for 40 miles for vessels of 12 feet draught. The only part difficult of navigation is the entrance. The banks of the river are mostly low and covered with jungle.

Mr. G. Elliott, Master, R.N., H.M.S. *'Agincourt'*, in 1846, to whom we are indebted for the sketch of Perah river engraved upon the chart, remarked that it was "very difficult to find a passage over the bar with more than 12 feet water. The best guide appears to be to keep the (north) coast on-board. No vessel should attempt to go over the bar without first sounding, as I do not think there can be more than 12 feet at low water."

In June 1874 H.M.S. *Hart*, drawing  $8\frac{1}{2}$  feet, ascended Perah river as far as the town of Perak, 37 miles from the entrance. Navigating Sub-Lieutenant W. J. Scullard describes the navigation as follows:—The best passage in is with the left (north) entrance point of river bearing S.E. by E.; in this track a general depth of 16 feet, with an occasional cast of 11 feet at low water, will be obtained. As the vessel gets near, some fishing stakes will be observed, and by passing between or to the southward of the stake in line with the north entrance point of river bearing S.E. by E. will lead up to the entrance of the river. As the water deepens steer over to the south side of the river, and keep it on-board—passing on the port hand a shoal marked with stakes—until a long clearance is seen on the north bank; then steer across to that side of river. In this part of the river there is only 15 feet at low water. When the long clearance and line of huts are seen on the south or left bank of the river steer gradually over. A mid-channel course will then lead to the town of Perak, there being deep water the whole way. At the bend of the river westward of the town the water is shoal, but plenty for a vessel drawing only  $8\frac{1}{2}$  feet. The *Hart* anchored off the town of Perak in  $6\frac{3}{4}$  fathoms soft mud. "The sketch by Mr. G. Elliott is correct, and the soundings are correct;" it proved a sufficient guide for the navigation of the river. The soundings are irregular.\*

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\* Captain Wright, H.M.I.N., in 1861 reported the existence of a channel a mile south of Pulo Katta leading to Perah river; it was much used by coasting vessels trading for tin, was bounded by stakes, and had 18 feet least water. H.M.S. *Lapwing* in entering this river, in charge of a local pilot, in the month of February 1875, grounded in 10 feet with Pulo Katta bearing N.W. by W.  $\frac{1}{4}$  W., 5 miles; Pulo Sambalang S.W. by W.  $\frac{1}{4}$  W.



**Tides.**—"Tides rise 13 feet. Off the town of Perak the ebb and flood streams run 2 to 3 knots an hour. The water in the river at Perak is fresh."

**Pilots** for Perak river may be obtained at Pulo Dinding.

**Supplies.**—At Perak supplies are scarce, and the water is not good.

The state of Perak, adjoining Province Wellesley (British), has a coast line of 100 miles in length, and a breadth of 50 miles. The whole state is a vast jungle, with a few scattered villages. The chief cultivation consists in rice. The chief article of trade is tin, brought from the workings situated near the foot of the mountain range, and sent to Penang. The tin mines are in the hands of the Chinese.\*

**FAIRWAY ROCK** is small, above water, and situated  $3\frac{1}{2}$  miles S. by E. from Little Dinding, and nearly the same distance, S.W. by W.  $\frac{1}{2}$  W. from Pulo Katta. There are from 16 to 20 fathoms close to the rock, 9 to 16 fathoms between the rock and the mainland, and 10 to 20 between the rock and Dinding islands.

**SAMBILANG or NINE ISLANDS**,† lying to the westward of the entrance of Perah river, occupy a space of 6 miles in a N.E. and S.W. direction, they are mostly small, bluff, high islands, covered with trees, and may be seen from a distance of 20 miles. The highest island is about 500 feet high. White rock, the south-westernmost of the group is 15 feet high and conspicuous, it lies in lat.  $4^{\circ} 0' N.$ , long.  $100^{\circ} 29' E.$  The southern island lies E. by S.  $\frac{1}{2}$  S.  $1\frac{1}{4}$  miles from White rock. Black rock, lying N. by E. nearly a mile distant from White rock, is small, low, and hardly discernible. From the north-easternmost islet Fairway rock bears N.N.W.  $\frac{1}{4}$  W. distant  $3\frac{1}{4}$  miles. The edge of the bank (depth of 3 fathoms) which lies off Perah river is 4 miles distant from the nearest of the Sambilang islands. The water deepens gradually to 10 fathoms between the bank and the islands. The Sambilangs are steep-to, and should be approached at night with great caution; there are from 23 to 26 fathoms close outside the islands, and the same depths are found very near and amongst the islands.

**Tides.**—Springs rise 12 feet, neaps  $10\frac{1}{2}$  feet.

**DIRECTIONS.**—The north and north-east winds frequently blow strong between Pulo Jarra and the islands at the north end of the strait; vessels, therefore, from the southward bound to Penang during the north-east monsoon should, after passing Dinding islands, keep near the edge of the

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\* A small strip of the Perak coast, with a breadth of 5 miles inland, has now been ceded to the British authorities.—*The Straits of Malacca, Indo-China and China*, by J. Thomson. London, 1875.

† These islands are improperly named Nine islands as there are more than that number.—Commander C. Y. Ward, H.M.I.N.

mud-bank which lines the coast, that they may not be delayed with the strong N.E. wind and short sea likely to prevail in the offing near Penang.

**PULO JARRA**, in lat.  $3^{\circ} 58\frac{1}{2}'$  N., long.  $100^{\circ} 5'$  E. is a conical island about 500 feet high, half a mile long, a quarter of a mile broad, and covered with trees. From the nearest of the Sambalang islands Pulo Jarra is 23 miles distant. The islet is steep to all round with the exception of a cluster of boulders which extend from the north-east side about a cable distant; there is a depth of 10 fathoms close outside the boulders, deepening to no bottom at 20 fathoms three-quarters of a mile distant.\* From 14 to 23 fathoms will be found near other parts of the islet.

In mid-channel between Pulo Jarra and Sambalang islands the soundings are from 25 to 40 fathoms. Pulo Jarra may be passed on either side, but for a sailing vessel bound to the south-east it is preferable to pass between it and Sambalang islands, for the current often sets strong to the north-west in the middle of the strait, and calms are more prevalent in the middle of the strait than near the coast.

**The COAST** from the entrance of Perah river to the entrance of Salangore river is low, covered with jungle, and skirted by a mud-bank, on the edge of which a depth of 3 fathoms is found at one to 5 miles from the shore.†

**SALANGORE RIVER.**—The entrance to this river may be recognised by Salangore hill which is high, conspicuous, covered with trees, has a fort, and is situated on the south side of the entrance. The coast mud-bank extends across the mouth of the river; the outer edge of 18 feet is about  $3\frac{1}{2}$  miles west of the entrance, and should not be approached under 5 or 6 fathoms until Salangore hill bears N.E.  $\frac{3}{4}$  E. The channel across the bank into the river has a depth of 3 feet at low water, and 18 feet at high-water springs; the deepest water is marked by a large fishing stake which bears S.W.  $\frac{3}{4}$  W. from Salangore hill, and N.  $\frac{1}{4}$  W. from Pulo Anza. Steering N.E.  $\frac{3}{4}$  E. for Salangore hill pass close to this fishing stake and thence between two rows of fishing stakes for the entrance of the river. A wide berth should be given to the west point of the entrance.

Salangore river is navigable for boats for about 19 miles, and for steam vessels drawing 8 feet 14 miles, or as far as Campong Seear, but there is little room to swing there. The bottom is soft mud. There is no danger in the river for a vessel of that draught except a mud-bank, with 3 feet water, situated about 3 or 4 miles from the entrance of the river, and about

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\* Navigating Sub-Lieutenant G. F. Whitmore, H.M.S. *Midge*, 1873.

† Berman river (entrance said to be nearly midway between Perah and Salangore rivers) is one of the finest on the coast, and has 12 or 13 feet on the bar; the channel is marked by fishing stakes. There was no opportunity of testing whether it was navigable far from the mouth, but it had the appearance of being so.—Commander A. T. Powlett, R.N., H.M.S. *Avon*, 1874.

half a mile westward a clump of attap trees 50 feet high. Close to the shore on either side of the mud-bank there is deep water. Above Campong Sear there are several sand-banks.

The river is tortuous in its course. The deepest water is found on the concave side of the curves. The banks of the river are very low throughout, and lined with attap and mangrove trees, affording concealment to the natives, who are often hostile. There are several stockades at the entrance of the river, and one at Campong (or village) Queor.\* Crocodiles are numerous.†

Salangore was formerly frequented for tin and other articles of trade, which articles are now carried to Penang in coasting proas.

**Caution.**—Vessels at anchor off Salangore river should be on their guard, never allowing any proas to approach them at night, for here, as well as in other parts of Malacca strait, piratical proas frequently lurk about in search of defenceless vessels.

**Tides.**—It is high water, full and change, at Salangore river at 5 h.; springs rise 15 feet, neaps 12 feet. The flood stream runs 5 hours, the ebb 7, at the rate of 5 miles an hour.

**PULU ANZA**, or Mudancoos, are two islets lying S. by W.  $9\frac{1}{2}$  miles from Salangore hill, and on the east edge of a bank which extends 16 miles to the north-west of Pulo Colong. There are from 4 to 7 fathoms close to the eastward of the islets.

**The COAST** between Salangore and Colong islands is thickly wooded, low, and overflowed in most parts at high water. It is skirted by the mud-bank, already mentioned, which is dry at low water, and extends 3 miles from the coast abreast Bottle islets, but near the north end of Pulo Colong approaching the coast within a quarter of a mile.

**Botel** or **Bottle Islets** are a group of four, lying near the coast to the eastward of Pulo Anza; they are situated on a shoal bank, and occupy a space of  $1\frac{3}{4}$  miles N.E. and S.W., the outer one being 2 miles from the shore. Calcutta or Sail rock, a dangerous rock, covered at half tide, and steep-to, lies S.W.  $\frac{1}{2}$  S. three-quarters of a mile distant from Pulo Tekolo, the south-western islet, and E. by N.  $2\frac{3}{4}$  miles from Pulo Anza large island. Between the outer Bottle islet and Pulo Anza there is a channel a half to  $2\frac{1}{2}$  miles wide, and having 25 feet least water, leading to the eastward of Pulo Colong.

**PULO COLONG**, or **CALLAM**.—This island is separated from the mainland by Colong strait, which is at this part a mile wide. The island is

\* H.M.S. *Rinaldo*, drawing 15 feet, entered the river in 1871, and bombarded the forts on both sides of the entrance.

† Remarks on Salangore river by Commander R. M. Blomfield, R.N., and Navigating Sub-Lieutenant J. S. Barrett, H.M.S. *Teazer*, 1871.

low and wooded, about 7 miles long in a N.E. and S.W. direction, and 4 miles broad. Close to the north-west side of the island is an island  $2\frac{1}{2}$  miles long in an E.N.E. and W.S.W. direction, and three-quarters of a mile broad. Near the south-west side of Pulo Colong, and extending a distance of 5 miles to the south-west, are a group of five islands, the two largest of which form one side of Colong strait. All these islands are low, formed of black mud, and covered with mangroves. Pulo Colong, together with the islands mentioned, are situated on a shoal mud-bank which extends 16 miles to the north-west of Pulo Colong, and  $6\frac{1}{2}$  miles to the south-west of the same island. At its north-western part the bank is 4 to 6 miles wide, and has from 6 to 10 feet water, which breaks at half tide.

**PULO LUMAUT.**—Separated from the south-east point of Pulo Colong by Colong strait, at this part nearly 3 cables wide, is the north-west point of Pulo Lumaut, an island which is 9 miles long in a N.E. and S.W. direction and three-quarters to  $2\frac{1}{2}$  miles broad.

**LUMAUT STRAIT.**—The eastern side of Pulo Lumaut is separated from the mainland by Lumaut strait, half a mile wide, and having very strong tides. This strait, though deep in most parts, is not an advisable channel for even the smallest vessels.

In the reach between the entrances of Klang and Langat rivers, at about 3 miles from the village of Lower Klang, there is a shoal having a depth of 4 or 5 feet, bottom hard sand. To pass from Klang river to Langat river keep the shore of the mainland close on-board until arriving off the point at the entrance of Langat river. From this point to the other side of the bar the services of a pilot are necessary.\*

**COLONG STRAIT.**—Pulo Colong and its islands to the south-west, with Pulo Lumaut to the south, form a channel or strait named Colong, which was formerly used by vessels of moderate size. It was a quiet and easy navigation, under the lee of the land, by which the dangers of the North and South sands were avoided; but since the establishment of a lighthouse on One Fathom bank (North sands) much of the danger and difficulties have been avoided, so that this strait can no longer be recommended as a convenient passage, although it is still used by coasting steam vessels.

First, or North reach extends S.  $\frac{1}{2}$  E. 5 miles, and is one mile in breadth. It has no dangers, there being 5 or 6 fathoms close to the banks on either side. The depths in mid-channel are  $3\frac{1}{2}$  to 8 fathoms. On the western side a narrow bank, having 21 feet, fringes the shore, and there is a small bank of 13 feet close to the north entrance of Lumaut strait. The strait here branches to the eastward and south-westward; the eastern branch is Lumaut strait, the south-western is Colong strait.

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\* Commander A. T. Powlett, R.N., H.M.S. *Avon*, 1874.

The second reach of Colong strait takes a W.S.W. direction for  $2\frac{1}{2}$  miles, and is clear of danger by generally keeping nearer to the shore of Lumaut than to the opposite side. Nearly mid-channel between Deepwater point (south-east point of Pulo Colong) and the north-west end of Pulo Lumaut is a bank having 24 feet, and a spit extends to the northward 2 cables from the entrance of a creek in Pulo Lumaut a mile to the south-west of Deepwater point. A bank on the western side, dry at low water and steep-to, is easily seen, there being some low bushes on it which are at all times visible. After passing the bank, the third reach, which takes a south-westerly direction to the sea, is entered, and is little more than a quarter of a mile wide in its narrowest part, but deep and safe; the depths in the middle are 8 to 11 fathoms, and 6 to 7 fathoms close to the banks on either side.

**DIRECTIONS from the NORTHWARD.**—From Salangore river bound through Colong strait steer directly for Pulo Anza, which may be approached close to its eastern side, and take care not to shoal less than 6 fathoms near the bank which lies to the north and west of that islet. Between Pulo Anza and the south-west Bottle islet the passage is  $2\frac{1}{2}$  miles wide, and has 4 to 7 fathoms water. From half a mile eastward of Pulo Anza a course S.E.  $\frac{1}{4}$  S. leads into the strait, which is difficult to distinguish until close-to. In approaching the north entrance of Colong strait, by keeping three-quarters of a mile distant from the shore, will lead in deep water.

From abreast Green point (north-east extreme of Colong island) keep in mid-channel, afterwards keeping towards the western shore to clear the bank of  $3\frac{1}{2}$  fathoms which lies nearly in the centre of the channel. In passing Deepwater point caution should be observed, as the tides set very strong past the north end of Pulo Lumaut.

Working into Colong strait from Salangore road, vessels should not stand into less than 4 fathoms towards the shore, and 6 fathoms towards the bank which lies to the westward. Bottle islands should not be approached within a mile, the bottom being uneven, and there being a dangerous rock (Calcutta rock) lying three quarters of a mile to the south-west of the outer islet. When about 4 miles to the southward of Bottle islets, the coast may be approached to within half a mile, but in standing to the westward vessels should not shoal less than 4 fathoms, and Pulo Anza should not be brought to bear northward of N.W. Should a vessel, however, ground here no damage can be sustained, the banks being of soft mud and the water invariably smooth.

**From the Southward.**—When Parcelar hill bears E.  $\frac{1}{2}$  N. the entrance of Colong strait may be easily discerned, the several points appearing as bluffs, the most southerly of which is Lumaut point, which is three-

quarters of a mile from the entrance of Colong strait. Caution is required in approaching Lumaut strait on account of the strong tides which set into it; caution is also required in steering for Colong strait not to get set to the westward of the south end of Pulo Colong, as a dry bank extends to the westward with deep water close to its edge. The best time for entering is near the time of high water.

**Tides.**—The flood stream runs through the middle of the strait until it is nearly half ebb by the shore, and this is generally the case in most parts of Malacca strait.

**KLANG RIVER.**—The entrance of this river is situated at the north-east bend of Lumaut strait, and is in lat.  $2^{\circ} 59\frac{1}{2}$  N., long.  $101^{\circ} 21\frac{1}{2}$  E. The river runs from a distance of 30 or 40 miles in the interior, and its banks are high and covered with mangroves and various sorts of palms. It is 2 to 4 cables broad, and free from danger for about 11 miles from the entrance, the least water found being 9 feet (low water). Vessels drawing  $8\frac{1}{2}$  feet can proceed for a distance of 12 miles beyond Klang. The soundings are irregular.

The village of Klang is situated at about 12 miles from the entrance of the river, and is defended by a fort and three stockades; there are also two stockades at the entrance and two below Klang village; the fort and all the stockades are on small eminences, the left hand stockades commanding the whole. There are about 20,000 Chinese in the interior working the tin mines, the tin being brought down in boats, which take a return cargo of rice.\* Supplies are scarce.

**Tides.**—It is high water at 6h., springs rise 15 feet, neaps 12 feet.

Off the mouth of Klang river the tidal streams run 6 hours each way, and turn  $1\frac{1}{2}$  hours after high and low water. It is high water at about one hour later at Klang village than at the mouth of the river.†

**LANGAT RIVER** has two mouths, one of which opens into Lumaut strait, the other (the Jugru) into the sea to the south-west of Parcelar hill. H.M.S. *Teazer* in 1871, drawing  $8\frac{1}{2}$  feet, proceeded through the Lumaut mouth to the village of Langat, 25 miles from the entrance. At about  $1\frac{1}{2}$  miles inside the entrance of the river, and extending nearly across, is a sandbank having only 2 feet at low water; the deepest water is very close to the banks on either side. With the exception of this bank, the shoalest water found was 9 feet (low water.) The *Teazer* moored opposite the Sultan's palace, a Malay intrenchment having a few guns, and had room to swing only in one direction. The Sultan of Langat derives a large income from the tin which is brought from the interior.

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\* Remarks by Sub-Lieutenant H. B. Warren and Navigating Sub-Lieutenant J. S. Barrett, H.M.S. *Teazer*, 1871.

† Commander A. T. Powlett, R.N., H.M.S. *Avon*, 1874.

Vessels should anchor a little below the town of Langat, so as to be clear of the tidal influence of Jugru river.

H.M.S. *Midge* in 1874, drawing  $8\frac{1}{2}$  feet, also proceeded to Langat. Navigating Sub-Lieutenant G. F. Whitmore remarks: "In proceeding up and down Langat river we hugged the bank very closely, always avoiding the points, and crossing to the opposite shore when necessary; the turnings are very sharp and numerous, and a longer vessel, or one with a single screw, would not be able to proceed to the anchorage off the town." A good look-out should be kept for snags. The services of a pilot are necessary.

**Jugru river.** — From Langat village Commander R. H. Blomfield, H.M.S. *Teazer*, 1871, proceeded in a boat down a rapid stream, some 5 or 6 miles long and full of dangerous snags, into Jugru river, which leads to the foot of Parcelar hill, and eventually to the sea south-west of the hill. This river has 6 or 7 fathoms at the entrance and 3 to 6 fathoms as far up as the hill, but on account of the shallow bank which extends across its mouth there is no passage except for boats. From the sea this would be the shortest distance for boats to reach Langat.

The entrance of Jugru river is scarcely perceptible from seaward except by several beacons which have lately been placed by the natives to mark the river's mouth. The edge of the bank off the mouth of the river is steep-to.

**Tides.**—It is high water, full and change, in Langat river at 6h.; springs rise 15 feet, neaps 12 feet. In Jugru river the rise and fall is about 8 feet.

**PARCELAR HILL, or BUKIT JUGRU**, in lat.  $2^{\circ} 50' N.$ , long.  $101^{\circ} 24' E.$ , at about 4 miles distant from the nearest part of the coast, is, when seen to the eastward or westward, of an oblong shape sloping at both ends, but when viewed from the southward it appears conical. It is thickly wooded, isolated, and is the only hill standing near the sea coast; it is easily known, and in clear weather may be seen from a distance of 35 miles.

**The COAST** from the entrance of Lumaut strait takes an easterly direction to Parcelar hill and the south-west entrance of Langat river; thence trends gradually to the south-east to Parcelar point, which is in lat.  $2^{\circ} 41' N.$  The bight fronting Parcelar hill is filled by a shoal bank extending from Lumaut point to Parcelar point. This bank is composed of fine hard black sand, like steel filings, and should be approached with caution as it is steep-to, the water shoaling suddenly from 15 or 10 fathoms to 3 fathoms.

**Parcelar point**, in lat.  $2^{\circ} 41' N.$ , being round and similar to the adjacent coast, is not easily distinguished, but a little eastward of the point there is a white beach or patch on the shore which may be discerned when the

point is bearing to the northward, and the observer not too far off the land.\* The point may be approached within a quarter of a mile, there being 15 fathoms at that distance.

From Parcelar point the coast takes an E.S.E. direction to a point situated 2 miles to the westward of the entrance of Sappan river, which is said to be navigable for vessels of 5 feet draught; thence E. by S. to the entrance of Lukut river; thence south to Tanjong Kamooning, thus forming between the latter and the point westward of Sappan river a bay  $2\frac{1}{2}$  miles deep and 7 miles across. This bay is almost filled by a bank on which there is 6 to 12 feet water.

The whole of the coast from Parcelar point to Sappan river is low, thickly wooded, and skirted by a sand-bank which extends half a mile to a mile seaward.

**Lukut river** is said to be navigable for vessels of 5 feet draught. At the mouth is a small village, the inhabitants of which carry on a trade with the Buges boatmen, who exchange grain, &c. for the tin which is brought down from the adjacent hills. Although no villages or huts are to be seen on the coast, yet it is inhabited by fishermen who apparently live a short distance from the beach, for smoke may constantly be seen rising all along the coast. There are two good fresh-water streams in the bay on the right side of the entrance of Lukut river.

A mile north of Tanjong Kamooning is Pulo Boorong, a small islet skirted by rocks and surrounded by shoal water. Half a mile south of Tanjong Kamooning is Pulo Arrang Arrang, a similar island skirted by rocks and standing on a shoal bank.

**BAMBEK SHOAL.**—The centre or dry patch is in lat.  $2^{\circ} 33' N.$ , long.  $101^{\circ} 37\frac{1}{4}' E.$ , in a direct line S.E.  $\frac{1}{2}$  E., between Parcelar point and cape Rachada, and nearly equidistant from both points; from the nearest part of the mainland Bambek shoal is distant 3 miles. The shoal is composed of hard sand and within a depth of 18 feet is 2 miles long in a N.W. by W. and S.E. by E. direction, and 7 cables broad; it is steep-to, the water deepening suddenly to 8 or 10 fathoms within a cable. Between Bambek shoal and the nearest part of the shore to the north-east is a small bank of  $3\frac{1}{2}$  fathoms to 10 fathoms irregular soundings, and between this bank and the shore there is a channel  $1\frac{1}{4}$  miles wide and having 12 to 29 fathoms sand and mud.

To the westward of the north-west extremity of Bambek shoal are two banks of 8 and 10 fathoms, distant from the dry patch  $2\frac{1}{2}$  and  $5\frac{1}{2}$  miles respectively. Vessels should not bring cape Rachada lighthouse to bear southward of S.E. by E.  $\frac{1}{4}$  E. to ensure passing to the southward of Bambek shoal.

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\* There is also a white patch about 5 miles more to the eastward.



Four miles E.  $\frac{1}{2}$  S. from the dry part of Bambek shoal is the north-west extreme of a sand bank a half to a mile wide, which extends nearly as far as cape Rachada; the bank is 9 miles long, has a dry patch nearly in the centre, and has from 2 to 5 fathoms water. Between the bank and the shore there is a passage a half or a mile wide, and having 5 to 19 fathoms water.

**Cape RACHADA, or TANJONG TUAN**, lat.  $2^{\circ} 25' N.$ , long.  $101^{\circ} 48' E.$ , is a steep bluff point, covered with trees, and easily distinguished, as it is higher than the adjacent coast, and appears when first seen in the distance like an island. Vessels may boldly approach the cape, there being deep water a quarter of a mile distant, and 20 to 40 fathoms, sandy bottom, within a mile, but to the northward of the cape vessels should not approach the shore within 3 miles on account of the sand-bank just mentioned. Near the cape there are two fresh-water wells.

From cape Rachada the low woody coast of Sumatra, distant 20 miles, may be seen, the strait being here more contracted than at any other part north of Malacca.

**Tides.**—Off cape Rachada the flood sets to the southward, the ebb to the northward; both streams are very strong and pass the cape in noisy riplings.

**LIGHT.**—On cape Rachada stands a round tower painted white, 78 feet high, which exhibits at an elevation of 446 feet above the level of the sea, a fixed *white* light visible from seaward between the bearings of S.E. by E. to N.W. by W. In clear weather the light should be visible from a distance of 26 miles. The line of the northern limit of the light passes over the centre of Bambek shoal, and half a mile south-west of Diana rock.

**ARROA ISLANDS** are a group of small islands lying nearly mid-channel between Sumatra coast and the North Sands; they occupy a space of  $8\frac{3}{4}$  miles N. by W.  $\frac{1}{2}$  W. and S. by E.  $\frac{1}{2}$  E., and the same space east and west. These islands are situated on a bank of sounding of 6 to 10 fathoms, the northern end of which extends 6 miles to the north-west, and the southern joins an extensive mud bank adjacent to the Sumatra shore; Arroa bank is steep to the northward, eastward, and westward, the soundings suddenly increasing to 18 and 20 fathoms.

**North rock**, lat.  $2^{\circ} 55\frac{1}{4}' N.$ , long.  $100^{\circ} 33\frac{1}{2}' E.$ , is small, of a considerable height, and has a reef surrounding it; there are regular soundings of 6 and 7 fathoms near it.

**Long (or Great) Arroa**, or Pulo Jummoor, is an islet lying  $2\frac{3}{4}$  miles S.W.  $\frac{1}{2}$  S. from North rock; it is about two thirds of a mile long, 400 yards broad, flat, covered with trees, and surrounded by rocks. At two

cables to the north-east of Long Arroa are two small islets nearly joined and having a reef of rocks which extends three-quarters of a mile to the north-east. A bank of 4 fathoms extends  $1\frac{1}{4}$  miles N. by W. from Long Arroa. Between North rock and the islets of Long Arroa the soundings are from 7 to 15 fathoms.

Malay fishermen sometimes visit Long Arroa to fish and procure turtle ; boats landing here ought therefore to be on their guard. There is a small spring of fresh water in Long Arroa, but not sufficiently large to water a vessel from. In the rainy season, in the months of October to January, an abundance of water may be found, there being in the island several natural tanks which dry in the hot season. The best watering place is on the western side, there being no rocks on that side,\* and a vessel may anchor close to the island in 6 or 8 fathoms mud, with the highest part of the island being North.

**Western Arroa**, or group of islets, three quarters of a mile to the westward of Long Arroa, are five in number, namely, Tookong Mass, Pulo Rendang, Paseer Panjang, Labuan Biti, Tookong Chama, and occupy a space of  $1\frac{1}{2}$  miles in a N.N.W. and S.S.E. direction by 3 cables in breadth ; they are all connected by a reef which is nearly dry at low water and extends half a mile N.N.W. of the northernmost island. Between Long Arroa and Western Arroa there is a channel of 7 to 16 fathoms.

**Battoo Balia** are a group of six rocks surrounded by a circular reef which is half a mile in diameter ; they lie E.  $\frac{1}{2}$  S.  $3\frac{1}{4}$  miles from Long Arroa and are separated from that island by a channel having 6 to 8 fathoms water.

A rock which covers at half tide lies East of Battoo Balia  $1\frac{3}{4}$  miles distant, and has 17 fathoms close-to.

**East Rock**, or Battoo Mandie, lying E.  $\frac{1}{4}$  S.  $6\frac{3}{4}$  miles from the south end of Long Arroa, is low, flat, and black ; there are 16 or 18 fathoms water within a cable.

**Round Arroa** or **Tookong Simbang**, lat.  $2^{\circ} 48\frac{1}{2}'$  N., long  $100^{\circ} 36\frac{1}{4}'$  E., is the highest of the group of Arroa ; its summit is covered with trees and may be seen from a distance of 15 miles. There are several rocky islets near it, two of which are visible 12 miles. Round Arroa with its outlying islets occupy a space of  $1\frac{3}{4}$  miles north and south, and three-quarters of a mile east and west ; the southern islet is named Pulo Tookong. From Round Arroa, East rock bears N.N.E.  $\frac{1}{2}$  E. distant  $4\frac{1}{4}$  miles ; there is a channel between having 7 and 8 fathoms water.

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\* The surveying vessel *Krishna* filled her tanks in the month of January in one day, the natives affording every assistance. The *Krishna* returned to the island in the month of March, but found it quite dry, with the exception of the small spring.

**Tides.** — The tides at Arroa islands are very irregular, especially during neaps when there appears to be a constant current setting to the north-west, slackening only towards the time of high water; although the direction and duration of the tides are so irregular, there is still a regular rise and fall of 14 feet at springs and 9 feet at neaps.

**Caution.** — Much care is requisite in approaching Arroa islands during the night as they are low, black, and difficult to see after dark. In working into the strait it is never advisable to approach these islands closely as the tides are so irregular.

**NORTH SANDS** comprise various sand-banks and spits extending from the Malay coast between Salangore river and Parcelar hill towards Arroa islands. The sand-banks have a general N.W. and S.E. direction, and have channels of 6 to 20 fathoms water between them. The north-west extremity of the sands is in lat.  $3^{\circ} 14' N.$ , long.  $100^{\circ} 50' E.$ : a narrow strip of sandbank, having one foot to 7 fathoms, and divided near the centre, extends thence in a south-easterly direction a distance of 12 miles; the southern half of this shoal is called Battoo Kinching, and has a dry spot about a mile from its southern end. All these banks and patches are usually visible during daylight. The principal dangers are Blenheim shoal and One-fathom bank.\*

**Blenheim Shoal**, having 4 feet least water, is  $1\frac{3}{4}$  miles long in a N.W. and S.E. direction. The shoalest part is in lat.  $3^{\circ} 3' N.$ , long.  $100^{\circ} 54\frac{3}{4}' E.$ , near the centre of the south-west side of the shoal. Parcelar hill, bearing E.S.E., leads to the south-west of the shoal which is distant 32 miles from the hill.

A small patch of  $4\frac{3}{4}$  fathoms lies West  $3\frac{1}{4}$  miles from Blenheim shoal.

Two miles N.E. by E. from the shoalest part of Blenheim shoal is a bank a mile long N.W. and S.E., and having 15 to 21 feet water. Eastward also of Blenheim shoal, distant 8 miles, is another bank 3 miles long in a N.W. and S.E. direction, and 7 feet least water.

**ONE-FATHOM BANK** is the most prominent danger on the North sands; it extends 2 miles in a N.W. and S.E. direction, is nearly a mile broad, and has 6 to 16 feet water. Its shoalest part is in lat.  $2^{\circ} 52\frac{1}{2}' N.$ , long.  $100^{\circ} 57' \frac{1}{4} E.$ , and bears S. by E.  $\frac{1}{4} E.$ , 11 miles from Blenheim shoal. Parcelar hill bearing E.  $\frac{1}{4} S.$  leads to the southward of One-fathom bank. Westward and eastward of One-fathom the soundings deepen quickly to 10 and 13 fathoms. North-westward the bank extends 8 miles, and has 4 to 8 fathoms.

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\* See Admiralty Chart: North and South Sands, Malacca Strait, Nos. 794a and 794b.

**LIGHT.**—An iron screw-pile light tower, painted in belts of red and slate colour, is situated on One-fathom bank in 15 feet water about half a mile to the eastward of the shoalest part of the bank. From the tower is exhibited a *revolving* white light, which attains its greatest brilliancy *every minute*; it is elevated 61 feet above the level of the sea, and in clear weather should be visible from a distance of 13 miles.

**Buoy.**—A red buoy is moored in 14 feet at the north end of One-fathom bank.

A small patch of 21 feet lies N.  $\frac{1}{2}$  E.  $4\frac{1}{4}$  miles from One-fathom bank lighthouse, and another in line between Blenheim shoal and One-fathom bank lighthouse,  $6\frac{1}{2}$  miles from the lighthouse. Lying nearly parallel to One-fathom bank, at a distance of  $4\frac{1}{2}$  miles, is a bank of 8 to 10 fathoms water 6 miles long and half a mile broad.

A patch of  $3\frac{1}{2}$  fathoms about 3 cables in extent lies S.W.  $\frac{3}{4}$  W.,  $7\frac{1}{2}$  miles from One-fathom lighthouse.

**Channels.**—There is a deep channel between the bank which extends from Pulo Colong and the eastern side of North Sands, but unless it were buoyed it would be dangerous for large vessels to use it, as no bearings can be given to direct them. Coasting vessels use this channel, keeping on the edge of Pulo Colong bank in 4 and 5 fathoms.

The channel between the north-west extreme of North Sands and Arroa islands is deep, there being from 20 to 60 fathoms mud, the soundings decreasing as the islands are brought to bear West. The deep water extends to within 5 miles of North rock, but close to East rock. A bank of 10 fathoms lies E.N.E., distant  $6\frac{1}{4}$  miles from East rock.

**SOUTH SANDS** are of similar formation to North Sands, and extend across to the Sumatra coast. There are several extensive dry banks between the part at present surveyed and the Sumatra shore, along which, in this neighbourhood, there are narrow and intricate channels. Native boats invariably cross the South Sands about 10 miles south of Parcelar hill. The neighbourhood of South Sands may be considered as the most dangerous part of Malacca strait, there being no near objects from which bearings can be given to clear the numerous dangers.

The eastern edge of South Sands forming the western side of the navigable channel through Malacca strait extend in a chain from a position 7 miles south of One-fathom bank (North Sands) in an E.S.E. direction 38 miles, and are distant from the Malay coast 12 or 15 miles. The northern shoal head, of  $2\frac{3}{4}$  fathoms, lies  $10\frac{1}{2}$  miles S. by E.  $\frac{1}{2}$  E. from One-fathom bank lighthouse. In a distance of 6 miles to the north-west of the shoal the soundings vary from 5 to 10 fathoms.

**Pyramid shoal**, the easternmost of the South Sands, is the most dangerous, being separated from the others a distance of 4 miles. Within a

depth of 4 fathoms the shoal is  $1\frac{1}{4}$  miles long in a N.W. and S.E. direction, half a mile broad, and has 6 feet least water ; the bottom is hard sand. From Pyramid shoal Parcelar hill bears N.  $\frac{3}{4}$  W., distant 23 miles, and cape Rachada lighthouse E.  $\frac{1}{2}$  S.,  $21\frac{1}{2}$  miles. Bambek shoal bears N.E. by E., distant 12 miles from Pyramid shoal.

**DIRECTIONS.**—Vessels, after passing One-fathom bank, should steer to the eastward, as they may approach the land with safety within 4 or 5 miles. In working to windward they should not stand farther off the coast than 10 miles, nor nearer inshore than 3 miles. The soundings near the sands are so irregular that they afford no guide as to the proximity of those dangers. Vessels therefore should approach with care.

**Tides.**—It is high water, full and change, from 5h. 30m., at the head of the North sands, to 6h. at One-fathom bank and on the South Sands. During springs the tides are regular running N.W. and S.E. on the North Sands, W.N.W. and E.S.E. on the South Sands at the rate of 3 to  $3\frac{1}{2}$  miles an hour, and run from two to three hours after the time of high and of low water, at a distance from the shore. During neaps the tides are weak and irregular. Springs rise 15 feet, neaps 9 feet.

**The COAST** from cape Rachada takes an easterly direction to the entrance of Lingey river, then south-easterly to Tanjong Kling. The coast forms three large bights in this space ; it is rocky and irregular, formed by rocky points having small bays between, and skirted by a mud flat, which extends in some places a mile from the shore ; there are several detached rocks which will be described.

**Pulo Pajuda** is a small islet lying about a quarter of a mile from the shore,  $2\frac{1}{2}$  miles eastward of cape Rachada ; it stands on the mud-bank which skirts the shore.

**LINGEY RIVER.**—The entrance of this river is situated 7 miles to the eastward of cape Rachada. The bar, which has rocks on either side, has a depth of 12 feet at high water springs, and  $9\frac{1}{2}$  feet at high water neaps. The river is navigable for vessels of 8 feet draught as far as Sempang, 10 miles from the mouth ; it then becomes too narrow for rowing boats ; it should not be attempted without a pilot ; a pilot may be shipped at Malacca.\*

**Tides.**—At Sempang springs rise 9 feet. The water is quite fresh at Sempang.

Two miles to the north-west of the entrance of Lingey river is a hill named Bukit Salamat.

Lingey river forms the western boundary of the British possession of Malacca.

**Battoo Mandi** is a rock awash off the entrance of Lingey river, and

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\* Commander A. T. Powlett, R.N., H.M.S. *Avon*, 1874.

one mile distant from the shore; it is marked by a beacon surmounted by a cage.

**Battoo Tiga**, or three rocks, are just above water, 2 miles E.S.E. from Batto Mandi.

**DIANA ROCK** is a large rock always above water, a mile from the shore; it lies S.E. by E.  $\frac{1}{4}$  E., distant nearly 16 miles from cape Rachada light-house, which light is obscured when the vessel approaches within half-a-mile of the rock. Inshore of Diana rock there are several other rocks and a sandy ridge of  $3\frac{1}{2}$  to 5 fathoms, lies one to  $2\frac{1}{2}$  miles north-west of the rock.

A shoal head of 2 feet lies S.E.  $\frac{1}{4}$  E.,  $1\frac{1}{4}$  miles from Diana rock, and S.W. by W.  $\frac{1}{4}$  W., one mile from Tanjong Panchoo. Off this cape also lie several islets within half a mile from the shore.

**RALEIGH SHOAL**, of  $3\frac{1}{2}$  fathoms, is about half a mile long, north and south, and lies S.  $\frac{3}{4}$  E., 18 miles from cape Rachada; S.W.  $\frac{1}{4}$  W.  $14\frac{1}{2}$  miles from Diana rock, and W.S.W. 17 miles from Tanjong Kling. The shoal is steep on its north side, on its other sides  $4\frac{1}{2}$  and 5 fathoms will be found within half a mile. There is a deep passage between Raleigh shoal and Pulo Roupas (adjoining Sumatra shore), 9 miles distant, the soundings varying from 20 to 45 fathoms. Between Raleigh shoal and the Malay coast, the soundings are from 20 to 30 fathoms.

**TANJONG KLING**, situated 22 miles S.E. by E.  $\frac{1}{4}$  E. from cape Rachada, is a low projecting point of land covered with high jungle and easily seen; it is the north-west boundary of Malacca bay, and may be approached to half a mile.

**Fisher islet**,  $2\frac{3}{4}$  miles to the westward of Malacca town, and  $1\frac{1}{4}$  miles from the shore, is about a quarter of a mile in extent, and situated on the mud bank which skirts the adjacent shore; the islet is red, of moderate height, its top covered with trees and easily discerned. There are 5 to 10 fathoms water within a quarter of a mile of the south-west side of Fisher islet. At night vessels should not shoal less than 15 fathoms in approaching this islet. Midway between it and the shore there is another islet.\*

**MALACCA**.—This town is built on either side of a small river of that name, and is the seat of government of the British settlement of Malacca. The country a few miles inland of Malacca is formed of undulating hills, moderately elevated, called Malacca hills, and 20 miles E.N.E. of them is Goonong Ledarly or Mount Ophir, having a triple peak, 3,840 feet high; the coast and land adjacent to the town are low and wooded.

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\* Navigating Sub-Lieutenant W. T. Thompson, H.M.S. *Avon*, 1874, states that this island does not exist, there being a narrow channel of 4 feet water between Fisher island and the shore.

On the left bank of the river rises the verdant hill of St. Paul, surrounded by vestiges of an old Portuguese fort. Around the base of the hill lie the barracks, lines, and most of the houses of the military, the stadthouse, courthouse, gaol, church, hospitals, convent, police office, school, post office, and master attendant's office. On the summit of the hill stand the ruins of the ancient church of Our Lady del Monte, erected by Albuquerque, and the scene of the labours of St. Francis Xavier; also the lighthouse and flagstaff. A little to the south rises the hill of St. John's, and in the rear of that of St. Francis; on these eminences are the remains of batteries erected by the Portuguese and Dutch; smaller knolls intervene covered with extensive Chinese cemeteries.

The larger part of the town, including the bazaars, are situated on the right bank of the river. The principal public institution in Malacca is the Anglo-Chinese college, established in 1818 for the instruction chiefly of Chinese and Malays; there are also many schools for Chinese and Hindoos.

**Population.**—The population of the settlement of Malacca in 1871 was as follows: Europeans, 47; Malays, 57,474; Chinese, 13,456; natives of India, 3,000. The town is reported to be healthy.

**Trade.**—The chief exports comprise tin, sugar, pepper, nutmegs, mace, sago, rice, buffalo hides, and horns, rattans, gutta, gum, coffee, and opium. The united value of the exports and imports of Malacca in 1873 was 776,731*l*.

**LIGHTS.**—On the summit of St. Paul hill is a turret which exhibits at an elevation of 146 feet above the level of the sea a *fixed* white light, visible in clear weather from a distance of 12 miles.

From the pier head at Malacca is exhibited a *red* light, visible from a distance of 6 miles.

**River.**—The entrance to Malacca river is nearly dry at low water, being obstructed by a bank of soft mud, which extends  $1\frac{1}{4}$  miles from the shore, and has 18 feet on its outer edge. The river is spanned by several bridges, and a pier extends seaward from the entrance a quarter of a mile. Boats can enter the river soon after a quarter flood. They should steer for the church on the hill, keeping it a little on the starboard bow, and when the bar is approached the channel may be discovered by the stakes at the entrance of the river. A small boat can with difficulty go alongside the pier at low water.

**Pulo Java**, or Red island, is composed of two islets separated by a narrow space, the inner islet lies three quarters of a mile to the south-east of the entrance of the river, the two occupy a space of 4 cables in a north-west and south-east direction, and are surrounded by shoal water.

**Pulo Panjang**, a narrow rocky flat, lies S. by E.  $\frac{1}{2}$  E., 2 miles from

the flagstaff at Malacca, and one mile from the nearest part of the shore ; it is about half a mile long in a W.N.W. and E.S.E. direction, and steep on its south side, there being 8 to 19 fathoms within a quarter of a mile, but on the other side the water is shoal. Pulo Panjang is marked by three white stone beacons, each surmounted by a diamond top, namely, one at the north extreme, one at the west extreme, and the other at the east extreme of the islet.

Between Pulo Panjang and Pulo Java, and situated on the edge of the bank which skirts the coast, lies a small islet.

**DIRECTIONS.**—Malacca road is included in the space lying seaward of a line joining Fisher islet and Pulo Panjang, and is a safe anchorage ; it is neither visited by the hurricanes of higher latitudes, nor is it within the influence of the monsoons of the adjacent seas. In approaching from seaward, the first objects that strike the eye are a cluster of trees crowning the summit of St. Francis hill, the star fort of St. John's to the south, the lighthouse and ruinous church on St. Paul's, and the white edifices which skirting its base, and extending along the seashore, are gradually lost in the thick groves of cocoanut trees which cover the dwellings of the Chinese and Malays. In the background of this pleasing view rise the hills of Bukit Bertam, &c., and in the distance the triple peak of Mount Ophir already mentioned.

The best anchorage in Malacca road is in 8 fathoms near the weirs, with the fort bearing N.E., about 2 miles off shore, or with Pulo Anjote and Pulo Undan (Water islands) in line S.E.  $\frac{1}{4}$  S. The soundings deepen quickly to 7 and 8 fathoms outside the coast bank. Under a depth of 10 fathoms the bottom is chiefly of mud ; exceeding that depth it is a stiff tenacious clay. On the east side of the road the bottom is rocky.

The sea-worm in this road is very destructive to vessels or boats not having copper sheathing.

Approaching from the southward at night, after rounding Water islands, which extend  $5\frac{1}{2}$  miles off shore, care should be taken not to approach Pulo Panjang too closely, as it is steep-to ; this reef is marked, as already mentioned, by three white stone beacons.

Leaving Malacca road vessels should steer well clear of the outer Water island as the flood tide sets towards the island.

**Tides.**—It is high water full and change in Malacca road at 7h. 30m. ; springs rise 11 feet, neaps  $8\frac{1}{2}$  feet. The tidal streams have a rate of 2 knots, and continue to run two or three hours after high and low water respectively.

**Winds.**—During the period of the south-west monsoon in the China sea, sudden hard squalls frequently blow into the road from the Sumatra side in the night, accompanied with lightning, thunder, and rain. These winds,



called "Sumatras," generally commence to blow at seven or eight in the evening, and attain their greatest strength at midnight.

**Supplies.**—Malacca is convenient for vessels requiring water and supplies. Water is obtained on application to the master attendant; and fish, yams, grain, sago, and a variety of fruits may be obtained at moderate prices; also poultry, hogs, buffaloes. Poon spars from Siak river suitable for masts may be procured.

**WATER ISLANDS** are a group of six, lying to the south-east of Malacca. Pulo Anjote and Pulo Undan, the two outer islands, lie S.S.E.  $\frac{1}{2}$  E and S.S.E.  $\frac{3}{4}$  E., distant  $7\frac{1}{2}$  and 10 miles respectively from Malacca lighthouse, and  $4\frac{3}{4}$  and  $5\frac{1}{2}$  miles respectively from the nearest part of the shore. The islands are of moderate height, round, and covered with trees. In shore of the largest, Pulo Bessar, the bottom is foul and rocky, but between the others there are good channels of 10 to 20 fathoms water. West of Pulo Bessar, half a mile distant, there is a small island named Pulo Srinbong. A shoal of 12 to 18 feet water extends a mile to the north and north-west of Pulo Bessar, and between the latter island and Pulo Srinbong. The channel between Pulo Dodole and Pulo Bessar has a dangerous rock nearly mid-channel, and having only 9 feet water. The channel between Pulo Undan and Pulo Nanka (next north) is  $1\frac{1}{4}$  miles wide.

It is always advisable to steer outside Water islands; from Malacca road the flood tide sets towards them.

**Water.**—On Pulo Bessar there are said to be several springs of good water, some of them in the form of wells, enclosed with bricks.

**ROB ROY BANK** lies nearer to the Sumatra side of the channel, and is, within a depth of  $5\frac{1}{2}$  fathoms, about 7 miles long in a N.W. by W. and S.E. by E. direction. The shoalest spot has 6 feet water and lies S.W. by W.  $\frac{1}{4}$  W., 17 miles from Pulo Undan (the outer Water island) and S. by W.  $\frac{1}{4}$  W., 19 miles from Tanjong Kling. Shoal heads of 9 to 17 feet extend thence  $3\frac{1}{4}$  miles in a north-westerly direction, deepening to 5 and  $5\frac{1}{2}$  fathoms in a distance of  $2\frac{1}{2}$  miles, and then to 12 and 14 fathoms. There is a depth of 14 fathoms  $1\frac{1}{2}$  miles to the south-east of the 6-foot patch, and 30 fathoms a mile to the eastward.

The outer edge of an extensive mud bank which skirts the shore of Pulo Bucalisse approaches within 4 miles of the south-west side of Rob Roy bank.

A shoal head of  $4\frac{1}{2}$  fathoms lies 8 miles S.E. by E.  $\frac{3}{4}$  E. from the 6-foot patch on Rob Roy bank, and  $14\frac{1}{2}$  miles S.S.W.  $\frac{1}{2}$  W. from Pulo Undan. This head is near the centre of a narrow ridge  $5\frac{3}{4}$  miles long in a N.W. by W. and S.E. by E. direction, and having 5 to 8 fathoms water.

10 to 15 fathoms water will be found 11 miles to the south-east of the ridge, and 13 fathoms 2 miles to the north-west.

**The COAST** from Malacca to Tanjong Seginting off mount Formosa is low, thickly wooded, and forms two bays about  $4\frac{1}{2}$  and  $2\frac{1}{2}$  miles deep; it has a general S.E. by E. direction, and is skirted by a mud bank which extends in some places  $2\frac{1}{2}$  miles off shore, and westward of the river Moar to 4 miles from the shore.

**Moar river.**—The entrance to this river is in the depth of the bight formed between the point adjacent to Water islands and Tanjong Tor, and is the eastern boundary of the settlement of Malacca; it is narrow at the entrance, and is only navigable by small vessels, on account of the shallow flat which extends off its mouth. The river, inside, is deep and wide.

**Bukit Moar** is an isolated thickly wooded hill in lat.  $1^{\circ} 59' N.$ , and 3 miles from the sea shore; it is visible from Malacca road.

**Tanjong Tor** is a low projecting point of land, covered with jungle, and dividing the two bays just mentioned. It is useful as a mark for clearing Formosa bank.

**Formosa river**, or Songey Battoo Pahat, is similar to Moar river, that is it has a shallow flat, having one foot at low water, and extending 3 miles off its mouth. The river, inside, is deep.

**Tides.**—It is high water, full and change, at Formosa river at 8h. 30m.; springs rise 11 feet, neaps  $8\frac{1}{2}$  feet.

**MOUNT FORMOSA**, 1,480 feet high, is the summit of a small range of undulating hills, which terminate at Tanjong Seginting, and is visible from a considerable distance.

Shoal water extends a distance of  $2\frac{1}{4}$  miles westward of Tanjong Seginting, and there is a small island lying within a cable of the shore north of the point.

**Formosa bank**, lying off Tanjong Seginting, is a dangerous shoal 4 miles long in a N.W. by W. and S.E. by E. direction, 3 cables broad, and having 12 to 23 feet water, bottom hard black sand. The east end of Formosa bank bears from Buket Moar S.E.  $\frac{3}{4}$  S., and from mount Formosa S.W.  $\frac{3}{4}$  W., 3 miles from the nearest part of the shore. A depth of  $4\frac{1}{2}$  fathoms will be found  $2\frac{1}{2}$  miles to the eastward of the east extremity; a ridge of 5 to 10 fathoms water extends 7 miles to the north-west of the west extremity.\*

**The COAST** from mount Formosa to Tanjong Bolus is low and thickly

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\* A small patch of 9 feet is said to exist E.S.E. of Formosa bank; and though this patch could not be found during the survey, it is considered that it may possibly exist, as these pyramidal-shaped patches are difficult to find.—*Horsburgh's Directory*, vol. 2, p. 132.

wooded, and abreast Pulo Pisang forms a bight 3 miles deep; it is lined by a shallow mud-bank which extends one or 2 miles from the shore except between Pulo Pisang and Pulo Cocob where it extends nearly 6 miles from the shore. Several small rivulets empty themselves into the sea in this tract of coast. Inside of a line, N.W.  $\frac{1}{4}$  W. and S.E.  $\frac{1}{4}$  E., joining Tanjong Seginting and the outer islets of Pulo Pisang, the bottom is uneven, many casts of  $3\frac{1}{2}$  and 4 fathoms with 6 and 8 fathoms close-to, being found, vessels therefore should keep outside the line.

**Tides.**—It is high water, full and change, from 8h. 30m. off mount Formosa to 9h. 30m. off Tanjong Bolus; springs rise 10 or 11 feet, neaps 6 or 7 feet; the streams run two or three hours after high and low water.

**PULO PISANG**, lat.  $1^{\circ} 29' N.$ , long.  $103^{\circ} 11' E.$ , is a mile long., E.N.E. and W.S.W., half a mile broad, and covered with trees. The island is formed of three hummocks, the central and highest one being 200 feet high, and may be seen from a distance of 20 miles. Between Pulo Pisang and the adjacent coast, which is 7 miles distant, the fringing mud-flat is almost continuous; and a spit, half a mile to a mile wide, steep and having 4 to 18 feet water, extends 5 miles in a S.E. by S. direction from Pulo Pisang. On the north-east edge of this spit is situated a small islet, and three-quarters of a mile West of Pulo Pisang are two small islets lying close together and having  $5\frac{1}{2}$  to 14 fathoms water close to their western side: fresh water may sometimes be procured on the larger of these two islets. A bank having 3 to 4 fathoms water extends  $4\frac{1}{2}$  miles to the north-west from the north-west side of Pulo Pisang.

**Tides.**—It is high water, full and change, at Pulo Pisang at 9h.

**Pulo Cocob** is a low flat wooded island 2 miles long., in a N.W. and S.E. direction, and  $1\frac{1}{2}$  miles broad; it lies  $11\frac{1}{2}$  miles S.E.  $\frac{1}{4}$  E. from Pulo Pisang, and is separated from the coast by a narrow creek or boat channel. The trees on the north-west side are of a bright green color, low and resembling grass; at the south-east end they are tall erect poon trees, like those on the adjoining coast. At low water the island is surrounded by a dry sand-bank which extends off the north-west extreme  $1\frac{1}{2}$  miles. Vessels in passing may approach to within three-quarters of a mile.

**Tanjong Bolus** or Booro, the south point of Malay peninsula, is a broad semicircular tongue of low land having high trees on its western side and low bright green mangroves to the eastward. All the adjacent country is low with the exception of Goonong Poolai or Pontiana, an isolated mountain, 2,150 feet high, situated 19 miles to the northward of the point.

A mud-bank, steep-to on its outer edge, extends between Pulo Cocob and Tanjong Bolus, and projects about  $1\frac{1}{2}$  miles from the shore.

Between Tanjong Bolus and Little Carimon island, Malacca strait is  $9\frac{1}{2}$  miles wide and has from 18 to 20 fathoms water.

**Fair Channel Bank.**—A bank of  $4\frac{1}{2}$  fathoms lies  $6\frac{1}{2}$  miles west of Pulo Pisang: this bank lies on a long narrow ridge of soundings of 6 to 11 fathoms and which extends nearly parallel with the coast as far as Formosa bank, and is steep-to.

**Long Bank.**—At a distance of 18 miles S. by W. from mount Formosa and  $22\frac{1}{2}$  miles W.  $\frac{3}{4}$  N. from Pulo Pisang lies the north end of a bank which extends 17 miles in a S.E.  $\frac{1}{2}$  E. direction, and has 16 to 30 feet water. This bank is steep-to and continues to the north-west 9 miles, with depths of  $5\frac{1}{2}$  to 11 fathoms, and to the south-east joins the Great Carimon group. The ship channel lies between Fair Channel and Long banks, which are from 6 to 7 miles apart.

Westward of the bank last described are numerous banks similiar to Fair Channel and Long banks, and extending to within a short distance of the fringing banks on the Sumatra side of the strait. It would be perplexing to the seaman to give any further description of these banks, the best idea of them is to be gained by studying the chart.

**SINGAPORE STRAIT.**—For description see China Sea directory, Vol. 1, chap. 9.

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